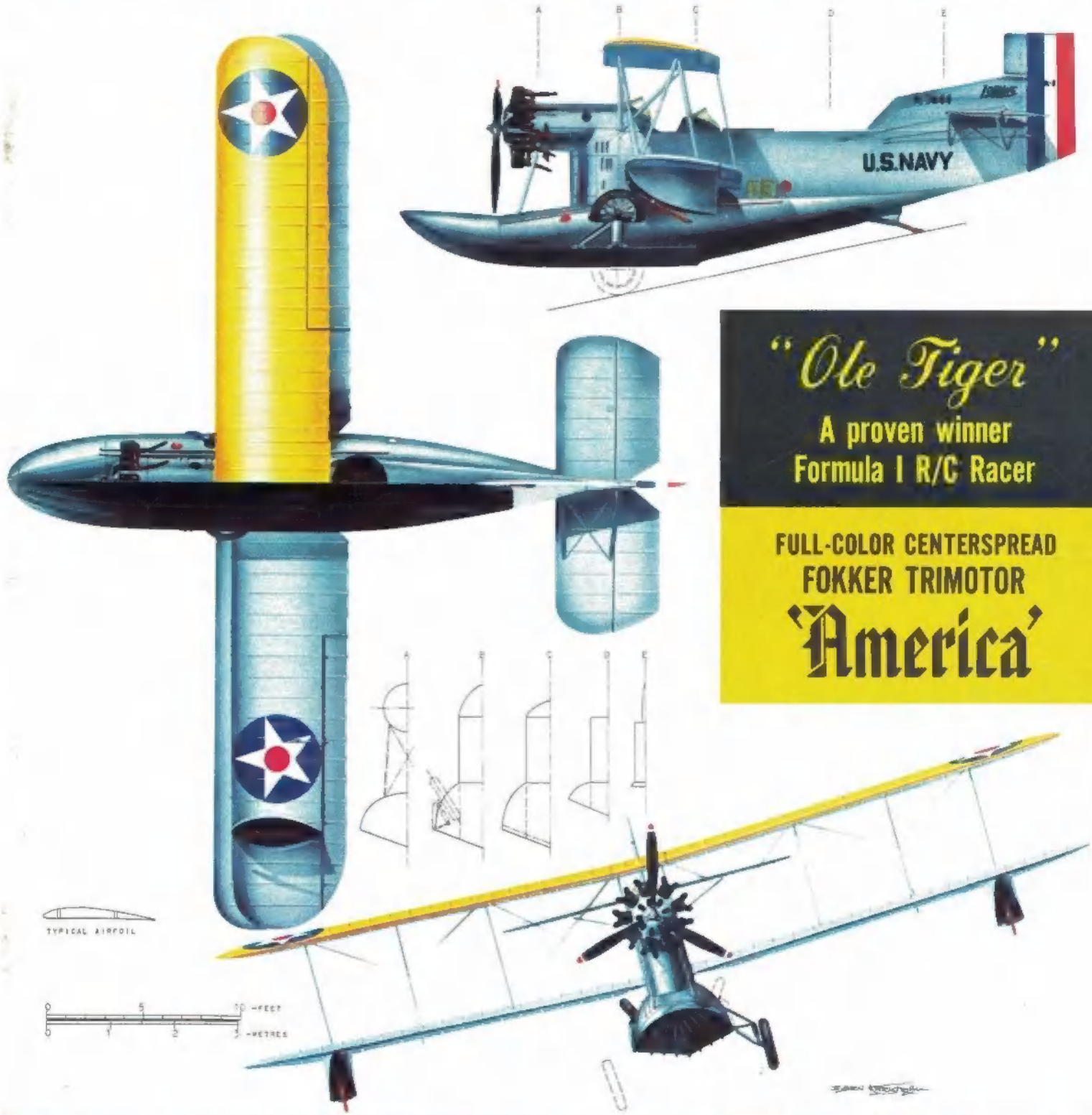
60c 7/-

FEBRUARY 1970

AMERICAN aircraft modeler



"Ole Tiger"

A proven winner
Formula I R/C Racer

FULL-COLOR CENTERSPREAD
FOKKER TRIMOTOR
'America'

RUSSIAN STORMOVIK FOR F/F FULL-SIZE PLANS

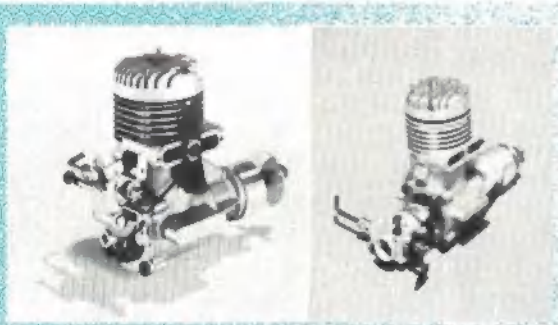
For the Tenderfoot: '

A model rocket

A VISIT TO SUPERTIGRE

This is an account of a very brief visit that I made to Mr. Garofali's Supertigre plant in Bologna, Italy, from Friday, October 24, to Tuesday, October 28. This was done with considerable help from Walt Schroeder and Bev Smith in New York City, not to mention the untiring efforts of Al Strictland of Orbit. Supertigre is expanding. They are building a new factory which will have substantially more floor space than the old factory. This should produce some more engines for 1970, however, the striking situation which is a political movement that shuts down all workshops large and small in Italy, is going to tighten up our delivery schedules for December 1969, and possibly the first two months in 1970. At this point in time, our Supertigre parts situation is better than it has been for some time. We are going to issue with newsletters to dealers, a list of the parts that we have in stock, the parts that are coming in, and the parts that we do not have. At any point and time, we generally run from about 85% to 92% covered on Supertigre parts situation; however, there are things like ABC cylinder assemblies which, up until this time anyway, cannot be manufactured in real large quantities, and this frustrated speed men trying to convert engines over to the ABC system. Free flighters will be glad to know that the free flight motor mount that Supertigre makes is now being produced with a large fillet between the pan and the firewall portion which should stop the cracking which we were experiencing. R/C pylon men have been after me to get Mr. Garofali to manufacture an ABC rear valve 40 (R/C). The bind is that he has changed the casting to a front intake engine. Regardless of this, he has agreed to make 100 special engines which admittedly will not look so good because of the unused front intake boss. Also, he is making 100 ABC G.21/40s for pylon racing. This is the 40 on the basic 29 frame which is a little smaller. Because of the ABC sleeve, these engines will cost more than the standard 40s. These engines will be fitted with MAG throttles with special large breathing holes. We are listing some prominent speed flyers who have these engines on back order at this time. Since the production run is limited, please add your name to this list if you want one of these engines.

Austin Leftwich	Pete Reed
G. W. Korpi	Curtis Brownlee
Maynard Hill	Don Lowe
Bill Welker	James Greer
H. Debolt	Jack Hertenstein
Ed Kech	Butch Schroeder
Jim Goad	



R.V. G-21/40 ABC R/C $37.50
R.V. G-40 ABC R/C $47.50

G-65 ABC MARINE R/C $65.00

MAG THROTTLE

The MAG Throttle will fit the following: ST 51s, ST 56s, ST 60s, G.60s, G.65s, and G.71s. Price, $8.95 each.

G-15 WITH PIPE

SUPERTIGRE PIPES FOR G.15 ARE NOW AVAILABLE

G.15 ABC RV $27.50, G.15 ABC FI $22.50
Pipe only G.15 $9.98, elbow only G.15 $1.95
G.21/29 elbow $2.25, G.60/71 elbow $2.50

JAMES BOKA'S ABC 65 3 POINTER

CLOSE OUT E.D. PIPES

G.15 pipe was $12.98, now $6.98; G.29 pipe was $14.98, now $7.98; G.65 pipe was $19.98, now $9.98.

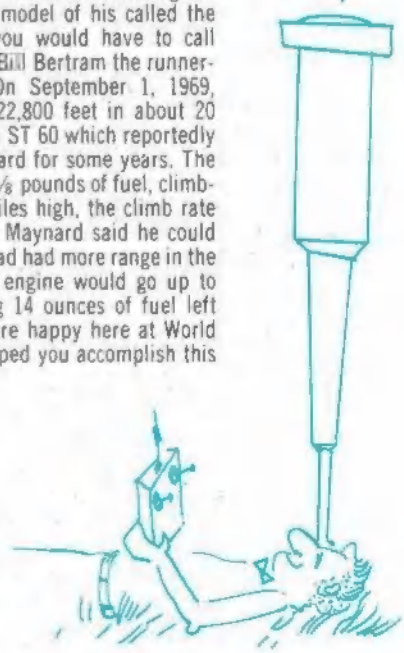
NOTE: The G.15 and G.60 Pipes are complete with elbows. The 29 and 40 size are less the elbow. The above pipes are manufactured in England by E. D.

NEW RECORD SET

Years ago when free flight was in its infancy, there was a man named Henry Struck who was a prominent contest designer. At the ripe old age of 15, I built a model of his called the "Record Hound". Today, I guess you would have to call Maynard Hill the Record Hound with Bill Bertram the runner-up Record Hound or vice versa. On September 1, 1969, Maynard put an R/C model up to 22,800 feet in about 20 minutes for a new record. He used an ST 60 which reportedly has done yeomen's service for Maynard for some years. The model took off at 7 pounds carrying 1⅛ pounds of fuel, climbing at 2,000 feet per minute. At 4 miles high, the climb rate was still 1,100 feet per minute, and Maynard said he could have gone considerably higher if he had had more range in the optics. Maynard said he thinks the engine would go up to 55,000 feet. Maynard reports having 14 ounces of fuel left when he landed. So, Maynard, we are happy here at World Engines that a Supertigre engine helped you accomplish this new record of yours.

John Maloney

22,800



WORLD ENGINES
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Take a seat in the Front Office of this 1,850 m.p.h., forty million dollar bird... and get ready for your "first ride" in the airplane that is about to change the lives of everyone who flies or is interested in aviation...

THE SST

Here it comes, ready or not

by Don Dwiggins

HERE COMES the SST – the greatest blessing aviation has yet bestowed on mankind – or blackest curse. And no one knows *which!*

What a book! A single volume that reveals the monumental design and technical problems that go with creating a triple-sonic transport plane . . . the hair-raising Washington politics . . . the vast implications for everyday life all over the civilized world . . . the enormous leverage that the SST will have on world economic power . . . inside stories about the designers, the engineers, the test pilots and future-planners who are converting the SST blueprints to a multi-billion dollar reality.

You get to know the SST from the pilot's viewpoint. Climb into the articulated nose section (droop snoot) and sit down beside Jim Gannett, Boeing's SST project chief as he simulates that first takeoff for you . . . the 707-like initial climb . . . then the new, complex flight profile as you go supersonic at about 45,000 feet. You move on up to operating altitude – about 13½ miles up – but you've got to watch your sonic boom pressure like a hawk. When you level off, you'd better do it just right or your passengers will enter an unwanted period of weightlessness that will have them feeling like yo-yo's shooting up the string.

Take a look at that instrument panel! A lot of stuff you haven't seen before. A pictorial moving map display, glide path display, altitude/Mach plot for sonic boom control. Other instruments, CR displays. This is quite a bird.

But it's just one of the SSTs – the American Boeing 2707. You'll want to have a look at other American designs, at the British-French Concorde prototypes 001 and 002 – and also at the Russian TU-144.

Here are a few more samples from this feast of information about the plane that moves nearly twice as fast as the rotation of the earth:

• All about sonic boom. Known: A steady diet of booms would probably drive most Americans nuts. Unknown: How to eliminate booms. (Solution-of-the-moment: go supersonic over the ocean only.) Learn the three kinds of sonic booms. Learn about the N-wave and why this might be the way to lower the boom on the boom.

• All about HICAT. High altitude clear air turbulence comes in like a bull whip on the tail of the Northern jet stream, and has grabbed even subsonic jet transports, ripping them to pieces. Even if you know how to beat this problem in an SST, you'd better have a thousand miles worth of warning that you're approaching HICAT. You're doing 1,850 mph and you could slam into that turbulence with meteoric force!

• What is the Russian TU-144 really like? Author Dwiggins got to see more of this 1,550 mph. craft than any Western writer before him. He gives you a full report.

• The British and French Concorde. Why did they decide to build a Mach 2.2 SST (1,450 mph) when they knew perfectly well how to build a Mach 3 job? Will this prove to be one of the shrewdest decisions in aviation history?

• Breakthrough thinking: How to make an aircraft pick up 1/3 more lift by teaching it to ride its own shock wave.

• You study all major SST drawing boards of the past and present, from Lockheed's triple-sonic bird to North American's delta-canard and Douglas' design.

FREE with Trial Membership

THE SST, HERE IT COMES, READY OR NOT (bookstore price, $5.95) is sent to you entirely *free* if you try a brief membership in the Jeppesen Aviation & Space Book Club, and agree to buy only 3 Club Selections over the next 18 months. *Selections are always offered to you at great discounts – 20% – 50% – even 70% off regular store prices.*

There are many other membership benefits too: access to aviation books that are difficult to get (at *any* price) in most stores . . . a FREE subscription to VAPOR TRAILS, the club's official monthly communication – filled with news and articles of importance to anyone interested in flying, as well as interesting and informative book and product reviews. At intervals there are other special services and activities for members – special sales – *extra free books* such as the one offered with membership in this announcement.

Come fly with us! Take THE SST *free* with trial membership. Mail the form below to the Jeppesen Aviation & Space Book Club, 8025 East 40th Avenue, Denver, Colorado 80207

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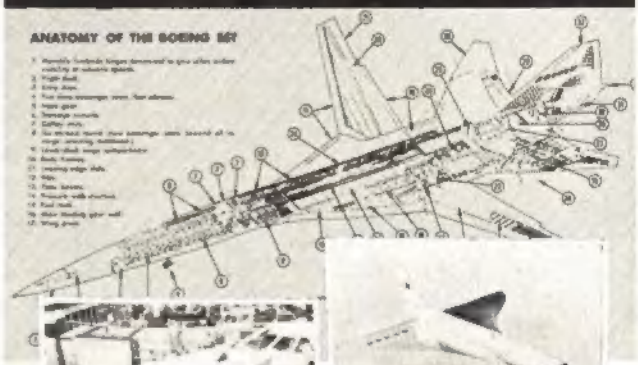
NEW JEPPESEN AVIATION & SPACE BOOK CLUB

with your agreement to buy only 3 other books in the next 18 months — all at great discounts (as much as 70% off regular store prices).



British-French Concorde's "droop snoot".

Sir George Edwards says the Russian TU-144 is a copy of his Concorde design.

TRIAL MEMBERSHIP

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Every month the Club offers a new Selection and Alternate Selections at member discount prices. All are described in VAPOR TRAILS, the club's official communication. If you want the Selection, do nothing and it will be delivered about one month later. If you **don't** want it (or prefer one of the many Alternates) you instruct us accordingly by using a handy "check-the-box" form always provided. GUARANTEE: If not delighted when your first Selection arrives, just return it. We'll cancel your trial membership and you can forget the whole thing!

JEPPESEN AVIATION & SPACE BOOK CLUB, Dept. AM-12
8025 East 40th Avenue, Denver, Colorado 80207

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I understand that I will have all rights and privileges of Charter Membership: I can buy books, maps, scale models, etc. at discounts of 20% to 70% plus shipping. I need buy only 3 Selections over the next 18 months after which I am free to resign any time. I understand I will receive a Free subscription to VAPOR TRAILS, the monthly club communication, describing latest Selections, Alternates and other items available at discount from the Club . . . with special sections devoted to aerospace news, valuable tips and information. If I want the monthly Selection, I will do nothing and it will come automatically, about a month later, at the Club's discount price. If I don't want it or prefer an Alternate, I will say so on a handy form you always provide.

Name _____

Address _____

City/State _____ *Zip* _____

AMERICAN aircraft modeler

COVER PHOTO: The 1928 U. S. Navy Loening OL-8 amphibian was drawn in authentic color by Bjorn Karlstrom. It had mixed wood-metal construction, fabric covering, and was stressed for deck landings and launching by Navy powder-catapult.

WILLIAM J. WINTER — PUBLISHER

Edward C. Sweeney, Jr., Editor — Sally Barry, Managing Editor

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STRAIGHT... ...AND LEVEL

Next June the Hall of Fame will elect five new modeling members. But practically none of us knows the real pioneers.

IT is sometimes surprising to be reminded that this hobby-sport of ours has a history. The fact of the matter is that, if we count Alphonse Penaud who flew a rubber-powered model airplane for more than 170 feet in 1872, the hobby is almost 100 years old. Recognizing that historical buffs in the general aeronautical field may tell us that Penaud was a late-comer, then the hobby could be more than 100 years old. (Penaud designed his pusher in an effort to prove that man might fly.)

Now what has all this got to do with foam wings, fiberglass, epoxy and Goodyear racing? And who in the heck was Penaud — or Percy Pierce, Cecil Peoli, David Newmark, Armour Seeley, Bill Brown, Maxwell Bassett, or even Dick Korda and Jim Walker?

There is now in existence a Hall of Fame committee and, in case you missed it, the first five Hall-of-Famers were selected last year.

To be asked to nominate a guy as a hall of fame candidate is a deucedly odd experience. Offhand, it sounds easy. But. . . . What makes a man famous? Everybody knows him and holds for him an instant impressionistic respect. Presidents are famous, but citizens peg a president anywhere from one end of the respect-spectrum to the other. Time marks the man — like Lincoln, or Washington. (And did you know, George Washington issued the first flying license to a French balloonist?) Since we don't have history books about model airplane people, time obscures, not elevates this hobby's notables.

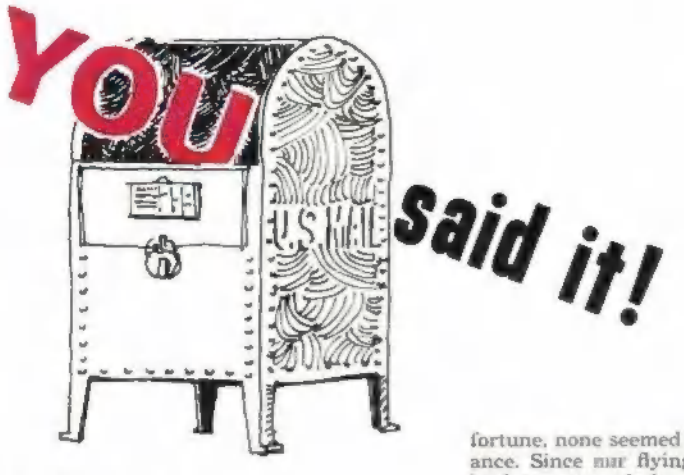
Magazines — our only reading matter on the subject — occasionally make a fleeting, mysterious reference to some shadowy pioneer. Baseball, and football, have their Hall of Famers, and museums to boot — Cooperstown, N. Y., where baseball was born, for example. Our own pioneers are less well known than the Pithdown Man.

The Second Annual Hall of Fame awards will be presented in Spokane, Washington, on next June 13. Frank Borman — incidentally, AMA's first man around the moon as Command Captain of Apollo VIII — is expected to be guest speaker. And how do you top that for a Hall of Fame selection? And Neil Armstrong, also a member of another mission, is a one-time Nats entrant.

The selection committee consists of the four magazine editors, and the five living Hall of Famers (selected last year by recommendation of a handful of us who helped get the thing off the ground), and the 11 AMA district vice-presidents. The five live and kicking Famers are: Willis Brown (first AMA pres.), Carl Goldberg, Charles Grant, Walt Good, and Frank Zaic.

As a member of the nominating committee, the writer wonders about those more or less forgotten oldtimers. We can't extoll their virtues here. But surely it will do no harm to say, for example, who Cecil Peoli was — maybe the present Hall of Famers will remember the name. Perhaps Charlie Grant knew him. Cecil was the guy who came up with the twin pusher and, in competition (oh, about 1910-'12) was the man to beat. His design influence extended into the early Thirties. We once timed a 1933 contest at Teterboro, now Bendix, N. J., where the rubber event consisted entirely of twin-pushers — excepting Hank Struck. Hank had a diamond-fuselage, ala the already proved "diamond" by Carl Goldberg and perhaps others, which was as out of place as a bazooka in a Kentucky-rifle shoot. The gas event, only one year old, was populated by guys like Grant and Kovel with the world-famous KG, and Leo Weiss now a tycoon of the electronics industry. Cecil Peoli probably already had been forgotten. He died as a barnstormer in Japan in 1913.

Today belongs to the Phil Kraft's and the Bob Dunham's, and the Hank deBolt's whom we all love — when they don't belt us out. Just for the heck of it, there was a chap named Christy Magrath, who as a boy watched the pioneer aviators at Kimlock Aerodome — buried under a St. Louis suburb now. When we were kids, Christy's name made your knees shake. The most wonderful models in books and mags bore his credit. Take a look at the picture below. That's half-sized model of Penaud's 1872 job. It was given by Christy to your publisher. There's a lot more to it, and to all these people and their fabulous stories. Anyway, 1970 selections surely will be stand-outs.



Special memories

To say that many of us relive our youth through our sons is an understatement because those of us who have sons who, to our good fortune, are enthusiastic about model aviation, find an unusual satisfaction in knowing that all juniors are not problems. We've read for years and years about the "junior problem" — the difficulty in getting the young boys to accept the problems, headaches, disappointments, plus the thrills and other compensations of free-flight. There is no doubt, such conditions do prevail almost everywhere. But this is why I say some of us are really fortunate.

Because of the demands of making a living, I have found it necessary to greatly reduce my modeling in the last number of years. Activities in Wakefield, indoor mike and condenser paper, and gas were my field of competition, and I make many friends over the country through participation in these events. My son, Frank M., does provide me with an opportunity to relive many of the thrills with his excellent building and flying abilities.

On our recent vacation to Skyline Drive in the Blue Ridge Mountains of Virginia, our fully packed car just had to make room for a box in which was stowed away Frank's Coupe de Hivre. This ship is an original I designed last year and which he built at that time. It hasn't been flown in competition simply because I haven't been able to take him to any contests. However, it has literally hundreds of flights to its credit and possesses a beautiful climb and really soaring glide.

We flew the plane at Big Meadows at Skyline Drive, an elevation near 3,000 ft. above sea level, right on top of the mountains. It was a thrill to be flying in this large meadow, the only flat land in this mountain area. Rattlesnakes and copperheads are known to be in the area but to our good fortune, none seemed to make their appearance. Since our flying session in this area, he has renamed the plane the "Skyliner."

One of my earliest recollections of private aircraft is the Taylor Cub and throughout my entire life I never did get around to building a model of one. Here again is an example of my great blessings — a Taylor Cub he built from one of the popular kits. This plane is a beauty in the air!

Currently he is completing a small rubber-powered Walt Mooney design of a Japanese high-wing monoplane, the Etoh. A Druine Turbulent was completed last winter, a Starduster is also in the final stages at this time.

When I read of what men like Frank Heeb and Sal Taibi have done with their careers in the field of model planes I can well imagine the satisfaction they must feel in reliving their boyhood days.

Frank S. Pavliga, Canfield, Ohio

Digs simple approach

While reading your editorial in the July '69 issue, I began to see that you are very right. I have tried to fly just about any model plane that is around in the last four or five years. I have tried to fly R/C but with little luck and quite a bit of lost money.

I have not bought a full-house propo rig yet and will probably not for a few years. I seem to be more content with my ¼A and ½A free-flights. I am just starting in profile carrier and it's great. My contest ship is a modified Starjet with a Veco 35 R/C on the snoot. I like to make all of my ships look as much as possible like real ones.

I am majoring in Industrial Arts at Arizona State and I edit a newsletter for the area club, the "Mesa Corsairs."

James W. LaBarge, Tempe, Ariz.

The inspiring ATOM

Thanks to a chance purchase of your July '69 issue, I've returned, after ten years, to the world of modeling. The "ATOM" seemed to be just what I required to make a modest re-entry. Building it was a ball. As a complete bungling, petrified, neophyte, I managed to have the time of my life learning to fly it. The only question that remains is whether reborn skills to "patch up" win out over my painfully slow improving ability to bring her down as birds and planes must.

As if all this were not enough, it seemed that at the first turn of the prop, pop from the Enya and sight of shiny craft, heretofore unknown modelers swarmed from depths of basement and tops of ladders to offer encouragement and comradeship. A new plane, a budding new skill and new friends. A combination I recommend to all.

As a favor, may I ask that someone take the time to advise me of any written matter that I can obtain that deals with U-Control flying, patterns and miscellaneous adjustments to the craft itself. Anything you can pass on will be appreciated.

Joe Welsh, Tenafly, N. J.

"Getting Started in Control-Line," by Howard Mottin, advertised elsewhere in this issue, answers many such problems.
— Publisher

It really happened

Free-flight Control-line. Impossible? Right. But I did it. I was flying a small combat ship with a hot 020 on it. Just as I was attempting a figure-eight, it happened. The plane broke loose and instead of doing snap-rolls and crashing, it spiraled up and over our neighbor's house. It climbed to about 1,000 ft., then sailed over the woods and out of sight. For all I know, it is still going.

The stabilizer did stick a little and must have been in neutral position when my bird decided to take off. I think the kids who saw me flying thought the expression on my face was funnier than the incident itself. If you can't afford the thrill of seeing your U/C go mod and take to free-flight, I strongly stress that you check your lines before each flight as you might, just might achieve the impossible. I still don't believe it, although my friends do.

Roger Baker, Middletown, N. J.

Free-flight empathy

I have never read an article with as much insight into free-flight as your Sept. '69 "Straight and Level."

Thanks for putting on paper what so many of us feel.

James C. Clem, Sand Springs, Okla.

Pint-sized hustler

Your Sept. '69 issue contained an article on the Profile Goodyear Racer "La Jollita" which interested my son and me. We built

Continued on page 8

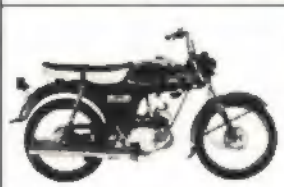
FREE 1,062 WINNERS FREE

PICK YOUR OWN PRIZE SWEEPSTAKES

1970 CESSNA 150.
The famous Cessna "Commuter" two-place plane; also all flying lessons leading to your private license.

EMPI "IMP" DUNE BUGGY.
Mag wheels and Zoomy tires; bucket seats and high-rise front fenders; modified VW engine; completely "street legal."

STARCRAFT 15-FOOT HYDRO-DRAGSTER.
Powerful 85 hp engine; Matador Red fiberglass deck and deep V-hull ski-boat; de luxe chrome trim and wooden racing wheel.



OTHER GROOVY PRIZES include 4 high-powered YAMAHA 100 cc motorcycles; 5 astronaut space suits worn by stars of "Marooned," the dramatic new Frankovich-Sturges film production for Columbia and 250 pairs of reserved-seat tickets to "Marooned"; 500 6-packs of valuable Revell model kits and 300 exciting Apollo kits.

Easy to win.

Really easy. First thing to do is decide which first prize you prefer. We're giving away all three, so "Pick-Your-Own-Prize" is really three great sweepstakes in one.

Make your choice, then write "Cessna 150," "EMPI Imp Dune Buggy" or "Starcraft Power Boat" on an end panel from any Revell model kit (or make a reasonable facsimile of the end panel on a 3-by-5-inch piece of paper, printing the name "Revell" in block letters). Send it along with your name and address to Revell, Inc., Pick-Your-Own-Prize Sweepstakes, at the address below.

As soon as we receive it, your name goes into the special drawing for that particular prize. Runner-up prizes (Yamahas, space suits, etc.) are drawn from *all* entries submitted.

Enter "Pick-Your-Own-Prize" now and enter often. Your chances of winning get better every time!

Contest closes May 30, 1970. Winners will be selected after August 1, 1970. All entries become the property of Revell, Inc., and none can be acknowledged or returned. No purchase necessary to participate. Judges' decision final. Sweepstakes subject to local, state and federal laws and void wherever prohibited. Tax liability is responsibility of winners. No substitute prizes will be given, nor will cash equivalents be paid. In accepting awards, winners grant Revell the right to publicize and promote their winning of awards. Revell employees, employees of Revell distributors, dealers or their immediate families are ineligible.

Revell

Revell, Inc., 4207 Glencoe Avenue, Venice, California 90291

FREE FREE

YOU said it!

Continued from page 6

one from plans secured from your Sudden Service Plans. However, we made one slight alteration. We built it to ½ scale (¾"=1') and powered it with a Cox Medallion 049. This pint-sized hustler flies at better than 50 mph on 35-ft. lines. It loops well, will fly inverted and goes through figure-eights with relative ease. It virtually seems indestructible as it has power-dived into our backyard quite a few times with a bent prop as the only damage.

We plan to construct another of the fine ships, but we plan to alter the scale to 1"=1'. Our powerplant for this plane will be an Enya 09. We are hopeful it will fly as well as its smaller sister.

May I suggest you try the ½-scale version with a hot 049. I'm sure you will also be pleased with the finished product.

Other slight alterations to construction details:

1) Main wing constructed from ¼" med. balsa. 2) Fuselage constructed from ¼" med. balsa. 3) All tail surfaces made from 3/32" med. balsa. 4) Landing gear eliminated as all ½A planes have a tendency to ground loop on landings. 5) Hard-wood motor mounts eliminated, but 1/16" ply doubler seem to suffice here.

Clyde Davis, Dallas, Pa.

Intrigued by R/C

I would like to tell you how much I like your magazine. In my opinion, it is by far the best. You have done so much to it: new pages, three-views, Getting Started in R/C, and "For the Tenderfoot." I read every page, even the R/C planes. This may seem strange since I don't fly R/C yet, but I feel there is a lot to learn about construction and building planes in the articles. I am mostly a control-line fan because of hills and trees. (I practically live in a forest.) In the 100-sq. ft. I've got, I try to fly rubber band or a few free-flight. I think F/F and R/C give more pleasure because you sit there and watch your plane just fly. "Man it's neat."

When reading "You Said It," I find that there are boys who have flown R/C for several years and they are 15. I am 15, and still flying F/F planes without really knowing how to trim them. I probably will get started in R/C soon, but money is my main problem. You can't work until you are 16. All in all I still think R/C is great and I'll get started soon enough to enjoy it for at least 50 years. So long now and again I want to thank you for your excellent magazine. It's what pushed me to better and bigger planes.

Chuck Lohre, Park Hills, Covington, Ky.

Any offers?

I was browsing through AAM and happened to read your "You Said It" column in the Aug. '69 issue. The lad that asked about Joe Ott plans! (Andrew Cottle, Brooklyn, N. Y.). I not only have Ott plans, I have about 150 assorted kits ranging from ¼" solids to 22", 27", 32" and several 40" flying-scale models by Joe Ott (1942). They are of the automatic construction. (When balsa became rare, they went to spruce, etc.

These kits even have the dried up tube of cement in them after 28 years. They are still in the original tri-color boxes — never opened. To name a few: Airacobra P-39, Airabonita, PBY Flying model, Stuka, Corsair, Hurricane, Spitfire, Hellcat.

I'm open for offers on "one" or the job lot. I built several to see if the kits had any potential. They are O.K. as is, but transferring to balsa is far more successful.

Ralph Fries, Box 183, Mendon, Mich. 49072

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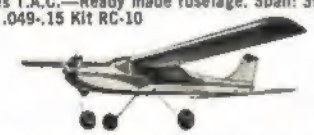

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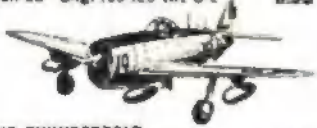

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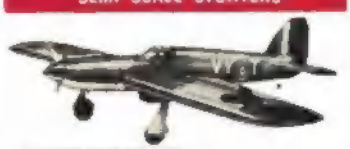

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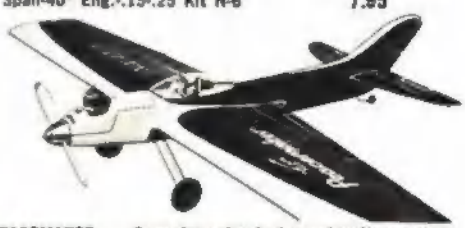

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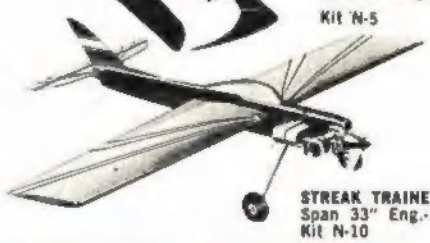

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TOP FLITE MODELS, INC. 2635 S. WABASH CHICAGO 16, ILL.

ON THE SCENE

A new look at Pattern contests

National Champ Leonard had some new ideas, so he organized and directed one of the finest R/C meets ever held.

NATE RAMBO PHOTOS BY AUTHOR

THE California R/C boys recently got some special treatment on the contest field. Every contest director should take some hints from the man who organized and directed one of the finest contests in R/C history. His approach may set a trend for things to come.

This year's top flyer, Larry Leonard has not been satisfied with winning pattern and Formula I at the Nats. He has now led the way as an extraordinary C.D. Believe it or not, our Mr. Leonard has gotten a big turnout of 56 contestants, squeezed six rounds of flying into two days (this is almost 350 flights), avoided all protests and complaints about judging, and sent everyone home with prizes. Let's examine his techniques.

Larry's first trick was to shape up all the troops at 8:00 a.m. the first day. The Expert Class flyers were immediately assigned to teams — judging teams. This almost guarantees good judging. In this contest there were three teams of experts; two judged and the third team flew. The teams rotated each round so that each team got a chance to fly every third round. In exchange for the experts being grounded two out of three rounds they were permitted to make several flights when their flying round came up. Furthermore, they could step to the front of the flight-line whenever they desired to fly.

Now that Larry was assured of good judging and everyone getting a fair chance in

Smiling Eddie Leonard announces winners for $1,200 merchandise stacked behind.

front of each of three sets of judges, he set forth to squash all the unhappiness of flyers being dissatisfied with their scores. This matter was taken care of simply by not giving out any scores. The only information given the pilot after each flight was what zeros he was given and the reason for the zeros. (Ever try to argue with three experts

Continued on page 75

Lanier flown by five in finals; L to R: Ehmke, Leonard, Oddino, Smith, Salkowski. Transmitters: three stick modes.

Jim Oddino cranks Lanier Citron for fly-off. Top five scorers flew same job without prior practice for extra award.

Bill Salkowski yanks off booster lead after starting Citron. Jim Oddino holds. Fifty-six contestants had a ball.

Dick Adams presents cup to top expert Bill Salkowski. The winner also had his choice of merchandise — new wrinkle.

CARL GOLDBERG

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The Versatile *Almost-Ready-To-Fly* Fun Model

For Single or Multi-Channel Radio Control; Also Free-Flight

Span 42"
Length 31"
Area 240 sq. in.
Weight 26-36 oz.

For .049 to .10 Engines

Only $17.95 PRCI

Can be flown 6 ways:

1. Single Channel Radio, Rudder Only
2. Single Channel Radio, Galloping Ghost
3. Two Channels, Rudder and Elevator
4. Three Channels; Rudder, Elevator, Engine Throttle
5. Four Channels; Rudder, Elevator, Engine Throttle, and Ailerons
6. Free Flight

Full explanation of each method given in plan.

FEATURES

- One-piece molded Wing, high-lift
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- One-piece molded Vertical Fin
- Molded Fuselage, completely assembled with firewall, nose gear, plywood floor, side rails, and main landing gear block already installed
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- Complete plans, with step-by-step illustrations
- Instructions on Operating Radio Control Models

Radio Control Flying is Fun! You can actually feel the thrill of controlling an airplane in flight — doing stunts, loops and rolls — and making it come back to you and land where you want. And the shortest way to success is with the unique new RANGER 42. This model has been carefully engineered, leaving only the simplest final assembly steps, all clearly illustrated. Flight stability is exceptional, as well as response to control. **All you have to do is add your engine, wheels, and radio control — only 6 to 8 hours work — and you're ready to go FLYING!** Just ask your hobby dealer — he'll be glad to show you the features.

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Semi-Scale Beauty in A Great Flying Model!

DELUXE — Includes New Fittings

$34.95

Tough, roomy cabin for front end, takes single to 10 channels or proportional. Steerable nose gear.

SPAN 62" AREA 540 sq. in.
LENGTH 43" WEIGHT 4½-5 lbs.

ENGINES FROM .19 to .35

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Span 42" Area 244 sq. in.
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Sr. Falcon Shown

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Span 56" Area 558 sq. in.
Length 43" Weight 3½ lbs.
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Length 28" Weight 16 oz.
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The Goodyear Racer with Enough Wing Area and Stability so Can Fly It!

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FOR 6, 8, 10 CHANNELS OR PROPORTIONAL

SPAN 54" 600 Sq. In.
LENGTH 44" WEIGHT 4½-5 Lbs.

FOR .19-.40

Most Beautiful R/C Ever Kitted!

World's FIRST Single or Twin Engine R/C Models

SKYLARK

Skylark 56 Shown

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SKYLARK 56 $21.50

Takes Single to 10 Channels or Proportional
Span 56" Area 528 sq. in.
Length 44" Weight 3½ - 4½ lbs.
For Single Eng. .09, .15, or .19
For Twin Eng. Use Two .09s or .15's

JR. SKYLARK $7.95

For Single Channel — Escapement, Servo or Pulse
Span 37" Area 235 sq. in.
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For Single Engine Use .049
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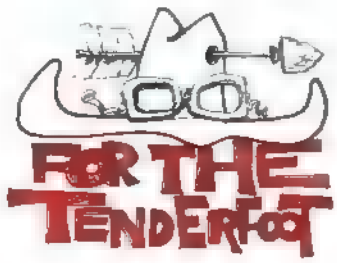


Cardboard Cutie

Try new methods, materials, and skills. Common corrugated cardboard makes simple, light models. Build this one, then design your own!

LORIS ROSE

SINCE I am rather a lazy sort, I believe in doing things in the simplest and easiest way possible. This has led me to depart from the customary built-up balsa-wood structures and to experiment with other methods and materials. I have worked with hollowed-out, carved balsa blocks; styrofoam, bristol board, and corrugated cardboard. The last mentioned is perhaps the simplest to work with.

I don't know exactly what started me working with corrugated cardboard. ■ gave me the idea, but the purpose was to develop something cheap, rugged, simple and easy to work with for junior modelers who haven't much in the way of money, tools, or developed skills. I do recall folding up pasteboard airplanes when I was seven years old and swinging them around my head on a string. I remember a man during World War II who built beautiful rubber-powered semi-scale paper airplanes, and another who devised tiny hand-launch gliders out of stiff paper. I have also built whip-powered, control-line, and tether airplanes, which I flew in a gymnasium, with fuselages made of cardboard tubes (taken from rolls of paper towels) with venetian-blind slats for wings.

Regardless of origin, I have found corrugated cardboard to be cheap (it's free!), rugged, and workable, and I have built five different designs, including ■■■ free-flight and four control-liners, all of them successful. I taught five different youngsters ■ fly on the first one before we wore it out.

As to construction, the airplane pictured ■■■ originally built of nine pieces of cardboard and a $^3/_4$" pine block. The wing was one piece (it had no dihedral then); the rudder and fin, one piece each; the stabilizer and elevator, one; the cowl, one; and the fuselage, four. The fuselage bottom, sides and central bulkhead folded up out of one piece. The rear fuselage top was one piece, as was the chin piece between the bulkhead and firewall. The windshield and top of the nose from windshield to firewall folded out of one piece. The cowl covering ■ a file card, rather than corrugated cardboard.

For tools I have found a Hyde C-2000 utility knife to be quite useful, although a good sharp pocketknife will do. A metal straight-edge, such as a carpenter's square, a sanding block and a cutting board pretty much complete the list, although a hand drill and coping saw would help in carving the firewall block.

In laying out the fuselage, be ■■■ the corrugations run across the fuselage, and ■■■ along its length. Cut the bulkhead narrower than the greatest width of the fuselage bottom (where it joins the bulkhead) by the thickness of the two sides. If the cardboard is $^1/_8$" thick, make the bulkhead narrower on each side by that amount for a total of $^1/_4$". If it is $^3/_{16}$" cardboard the bulkhead would be cut narrower by $^3/_8$" total, and so forth.

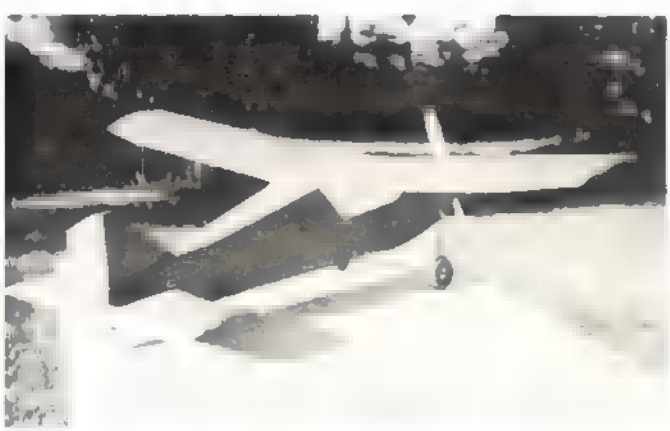
The extreme rear of the fuselage bottom (where the rudder post would ordinarily be) should be drawn the same width as the thickness of the stock the rudder and fin are made of. If the thickness of the two fuselage sides is greater than this, they can be compressed to the proper thickness.

The edge of a block of wood can be pressed against the foldlines, making a slight indentation to insure the creases forming where you want them and in a straight line. Don't press so hard as to break through the surface of the cardboard.

The wing should be laid out with the corrugation running spanwise so that it can be cambered by slitting some of the corrugations ■■ the underside. The leading edge of each strip thus formed can be inserted under the trailing edge of the strip in front of it. After you have formed the desired camber, these laps can be coated with glue so that the wing will hold its camber by itself. Wing leading and trailing edges can be pinched together and taped with Magic Mending Scotch tape. Corrugation holes at wing tips can be taped also, or left open.

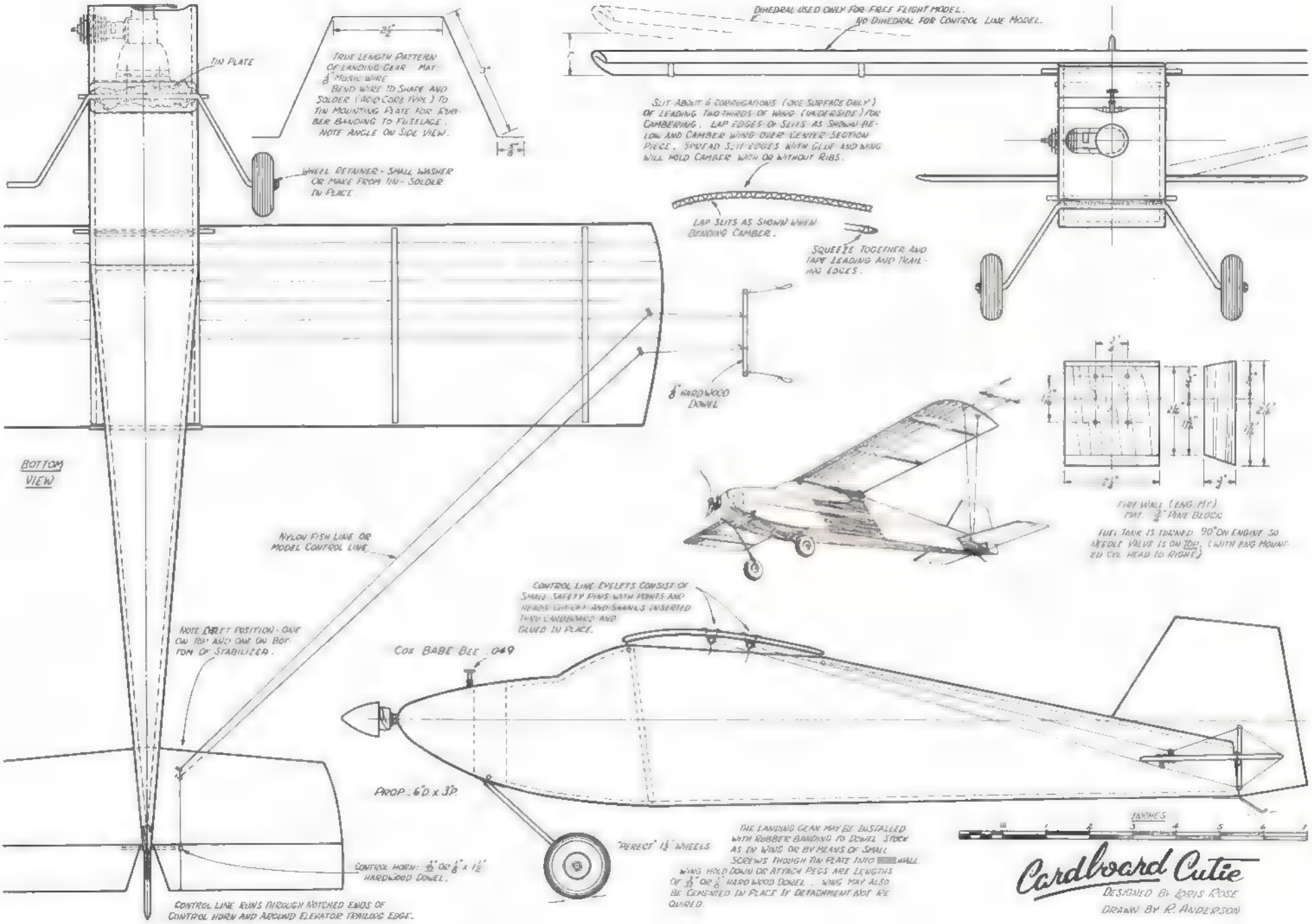
Tail surfaces are made without hinges. Simply cut through one surface and crease the other side. The paper side which is left

Continued on page 72



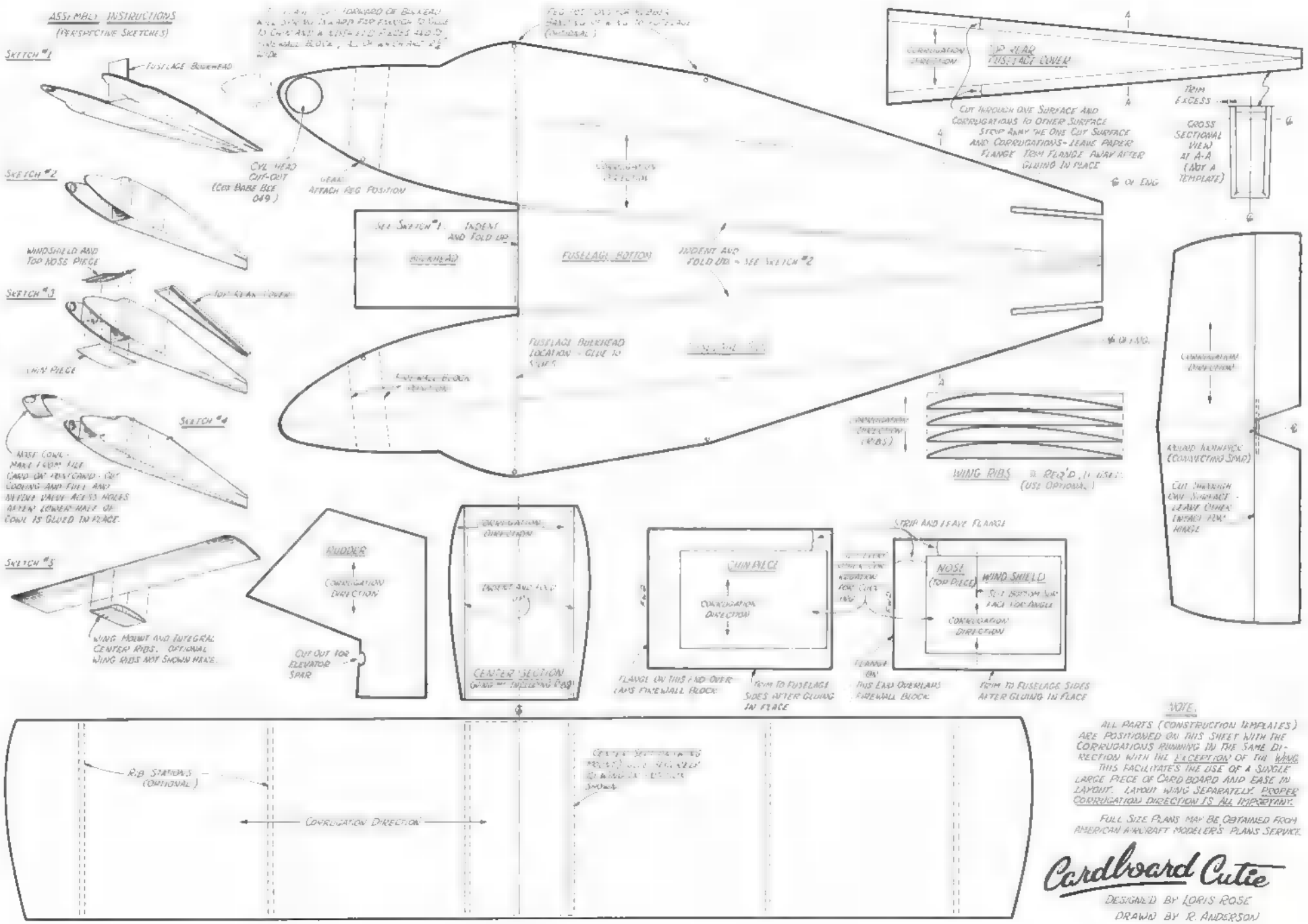
Box fuselage with ■ little paint makes Cutie look like real plane. With 20' flying lines, its speed won't make you dizzy.

Note special details of each part as mentioned in text. Wing on right has cardboard wrapped all the way around for extra strength.



Cardboard Cutie

DESIGNED BY LOUIS ROSE
DRAWN BY R. ANDERSON



NOTE.

ALL PARTS (CONSTRUCTION TEMPLATES) ARE POSITIONED ON THIS SHEET WITH THE CORRUGATIONS RUNNING IN THE SAME DIRECTION WITH THE EXCEPTION OF THE WING. THIS FACILITATES THE USE OF A SINGLE LARGE PIECE OF CARD BOARD AND EASE IN LAYOUT. LAYOUT WING SEPARATELY. PROPER CORRUGATION DIRECTION IS ALL IMPORTANT.

FULL SIZE PLANS MAY BE OBTAINED FROM AMERICAN AIRCRAFT MODELER'S PLANS SERVICE.

Cardboard Cutie

DESIGNED BY LORIS ROSE

DRAWN BY R. ANDERSON

GETTING STARTED IN R/C

How digital systems work.

HOWARD McENTEE

SINCE we have stuck closely to elementary systems and discussions in this series, beginners may wonder why we are now delving into the mysteries of the most complex equipment used today.

For one reason, some expert flyers — and some manufacturers — strongly recommend that a beginner purchase a multi-control digital system right at the start, since that's probably what he will want eventually. We go along with this thinking, but with several reservations.

It is good advice, if the beginner is serious (many dabble a bit, then drop R/C for some other endeavor). It assumes the $300-400 cost isn't a serious budget strain; and that he is willing to take extreme care in the installation to avoid situations that could cause "built-in" interference to the receiver. However, digital systems are available to handle from one to eight controls; you can also get them for Galloping Ghost and similar systems using non-feedback servos. So let's see basically how they operate, without going into deep technical angles.

Digital systems operate via pulses, just as do most other proportional systems, but the pulses look and act entirely different. All non-digital systems today send out pulses of audio tone. Digitals do not utilize tones (though what you hear on a monitor receiver sounds like an audio tone). The name "digital" was applied to these systems because they work in some ways much like digital computers. Circuits in the latter are either off, or turned on fully, and our R/C digital systems utilize the same general techniques. A typical series of pulses from a digital transmitter is seen below (from the Heathkit system in this case).

You'll note that the transmitter is "putting out" most of the time, but the output is interrupted by very brief off-pulses. Some early digital systems worked oppositely, but the predominantly on-signal technique helps overcome interference of all sorts. A receiver is much more immune to extraneous signals when it is getting a strong incoming signal on its exact frequency. Note that this five-control system actually sends out six off-pulses. Pulse number 1 is often called the "reference pulse." Then we see No. 2 (elevator), No. 3 (aileron) etc. The more critical controls are usually handled by the earlier pulses in the series.

The series of six pulses is called a "frame." These frames are repeated continuously, to produce what is called a "pulse train," what you hear on a monitor receiver. Systems designed to handle more or less controls will have more or less pulses in each frame. Note that the frame time is 16,000 micro-seconds (that's .016 sec., since "micro" denotes one-millionth). This means the single frame series of six pulses is repeated about 66 times per second, often called the "frame rate."

Each pulse is about 350 u S. long, and each succeeding pulse is 1,500 u S. after the previous one (when all controls are in neutral). At the end of each series of six pulses, there is always a much longer period of time, called the "synch pause." One might say this pause allows all the circuits to catch up and be ready for the next frame of six pulses. The pulses which are shown in solid lines denote neutral controls. Note the dotted pulse which shows how No. 6 (auxiliary control) might be moved in one direction. This pulse would be to the left of the solid neutral No. 6 pulse position, for the opposite direction.

Here, moving pulse No. 6 does not change any of the previous pulses. However, while reference pulse No. 1 always appears in the same spot, if any of the pulses from 2 through 5 are moved, all pulses to the right move the same distance, to either right or left. If pulses 2-6 were all moved to the right, the synch pulse would be much shorter, but it would still be appreciably longer than the 1,500 u S. spacing seen between individual pulses below.

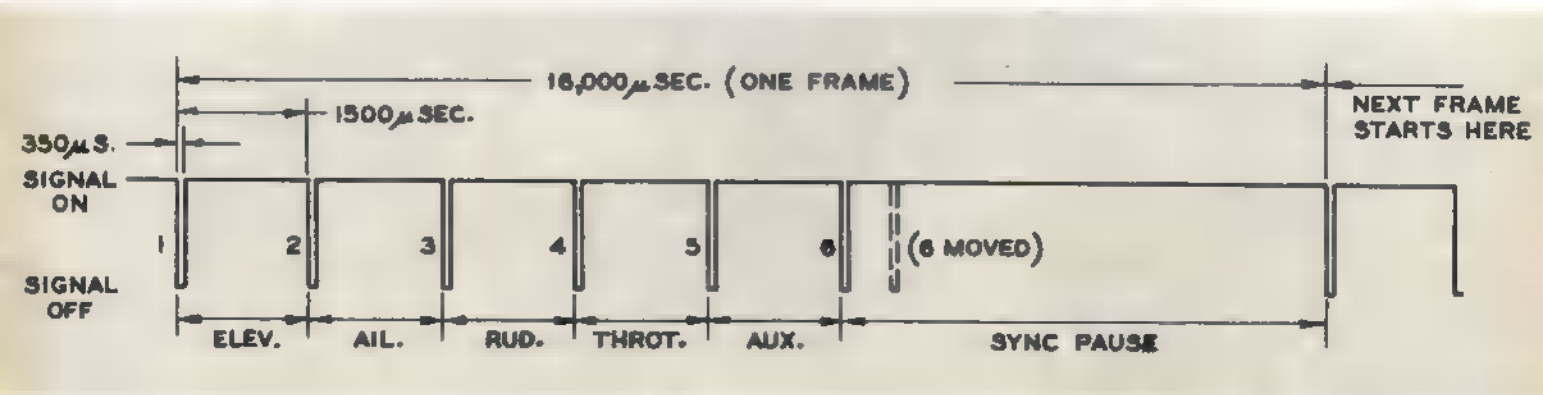
In our control systems, we want an analog (meaning smooth and stepless) movement of the control stick to produce a similar smooth and stepless movement of a control in the model. At the transmitter, control stick movement is transformed into the pulse frames seen below by what is called an "encoder." The pulses go out over the air, are picked up by the receiver and routed to the correct servos by a "decoder."

The extremely short pulses would not apply very much average current to the servo motor, even though each pulse gives full battery power to the motor. Servos therefore incorporate a "pulse-stretcher" circuit to boost servo power, and transform servo output motion back to a close simulation of analog action. Usually, the servos still move in a series of tiny steps. You can feel this action at the servo output, as you move the control stick.

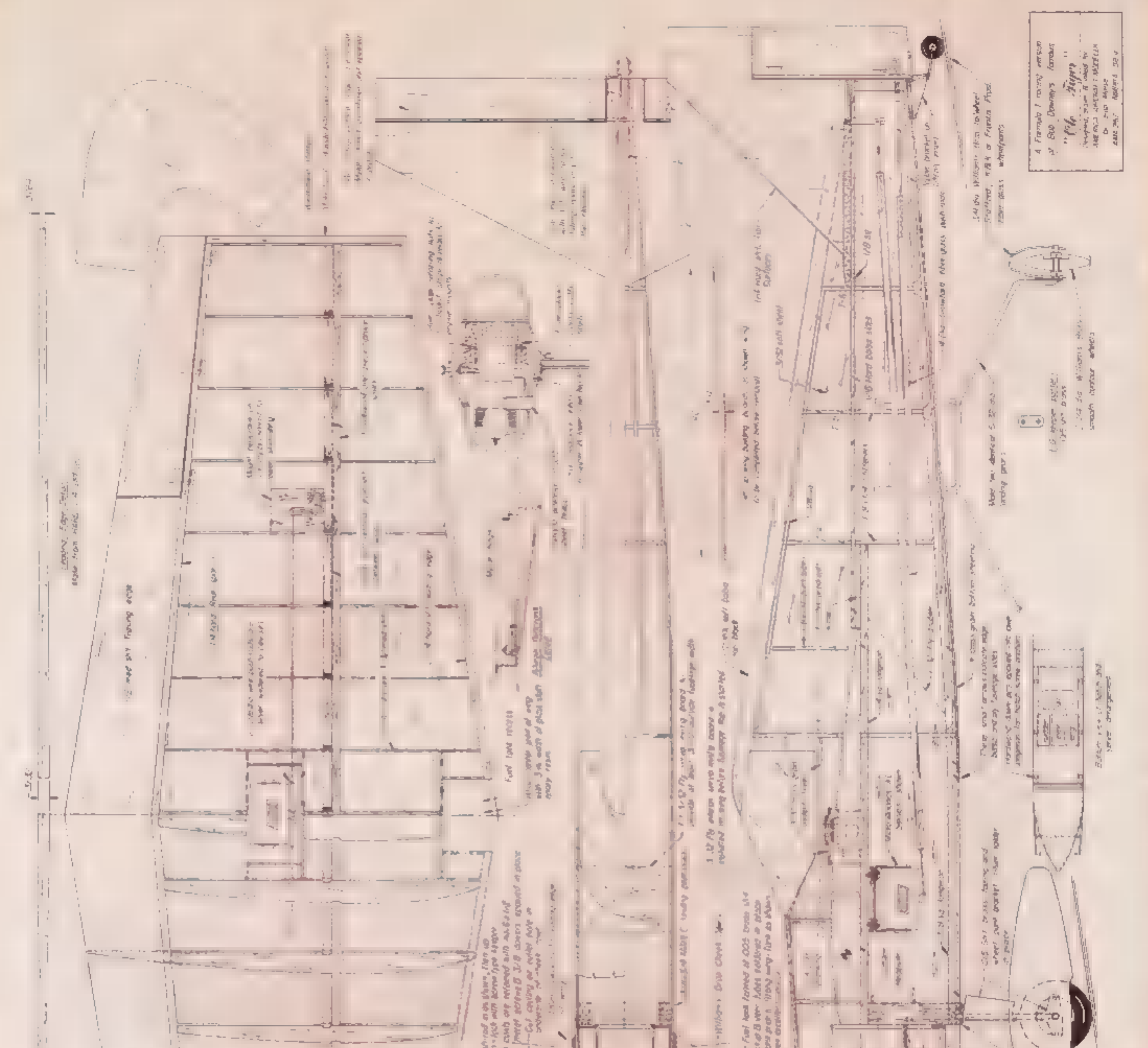
Because digital systems do not send a solid signal to the receiver (there is no signal during the off-pulses), they are more interference-sensitive than those systems that send a steady RF output, and pulse an AF tone for control purposes. Our equipment makers are continuously making improvements to reduce this interference sensitivity, but it is still good practice to eliminate *all* metal-to-metal joints in the plane (in control linkages, wheel-brake linkages, throttle linkages and so on). Most "interference troubles" with digital systems probably arise from inside the plane, rather than from other transmitters! Servo motors produce "electrical noise" when they operate. Various means are used to reduce this, but the antenna of a digital receiver should be run as far away as possible from servos, or any of the interconnecting wiring in the model.

A digital system may be used with any desired number of servos up to its maximum capacity, of course. A five-control system will work a single servo perfectly; this servo could be operated from any of the five control levers or sticks on the transmitter.

Digital systems have topped all other multi-propo systems because they are relatively simple to "tune up" at the factory. They are adaptable to any desired number of controls (many systems sold today can be converted at the factory to handle a higher number of controls by simply adding a few more parts to transmitter and receiver, and the desired extra servos), and they produce full servo power for any control stick movement, however small. They undoubtedly will be with us for some time to come, so beginners might do well to gain a little understanding of their workings.



One frame of five-channel set has six pulses. Distance in time from end of one pulse to beginning of next determines servo position.



FULL SIZE PLANS AVAILABLE — SEE PAGE 60

"Ole Tiger"

Beautiful and a bit different, this winning Formula I pylon racer really stays in the groove.

BOB MORSE

I am another one who has been bitten by the racing bug. Put it off for a couple of years, and then was shamed into building a Formula I ship. And I grabbed a good one to start with, a T-tailed Rivets. This business of "going fast and turning left" really turned out to be a ball, and look where it's got me — trying to write a story about one of my all-time favorite racing aircraft, Bob Downey's famous "Ole Tiger."

Ole Tiger began life in 1947 being built by Jim Miller and raced as "Miller Special Little Gem." In 1963, Bob Downey rebuilt the Miller Special into the Ole Tiger configuration and has been a consistent winner since then.

The October, 1967, issue of "Private Pilot" has some excellent photos and an informative article, and Volume IV of "Racing Planes" (Aero Publishers, Fallbrook, California) has an excellent racing history of Ole Tiger, and also has the three-view drawing that provided the data for our model version.

We began doodling up our 450-sq. in. version during 1968 and finally got her airborne in the fall. She's been flown at Mile Square, Cotati, Turlock, and at the Pioneers Field at Sunnyvale — all in California.

Ole Tiger is not a difficult ship to build, and it does build into an attractive model. One of the features we have tried to preserve is the extremely low aspect ratio of the wing. We have done a little revising in this respect, but the overall effect is still there. So, if you'd like something a little different to race, have a go at this model.

Wing: One of the features is its extremely thin wing. Have no fears though. It is not new and has been well tried and proven, both in flight characteristics and strength in such ships as Joe Foster's "Rivets," and Jim Kirtland's "Shoestring."

In addition to having excellent flight characteristics, it is perhaps the easiest wing to build that we have ever had.

Wing data as follows: Span, 40" and chord of 14½; thickness at root, 1" (14%), at the tip, 3%; mean thickness of the wing is 8½%; aspect ratio, 3.4.

As you can see on the plan, the wing is built on building boards. It goes without saying that your wing will be better than the board you build it so start with a *good* foundation. We obtained building boards from a pattern shop, and it's called "Perfect Plank" and consists of successive vertical laminations of pine and is faced in a milling machine and is true. It's fairly expensive, but purchased, is good for a long time.

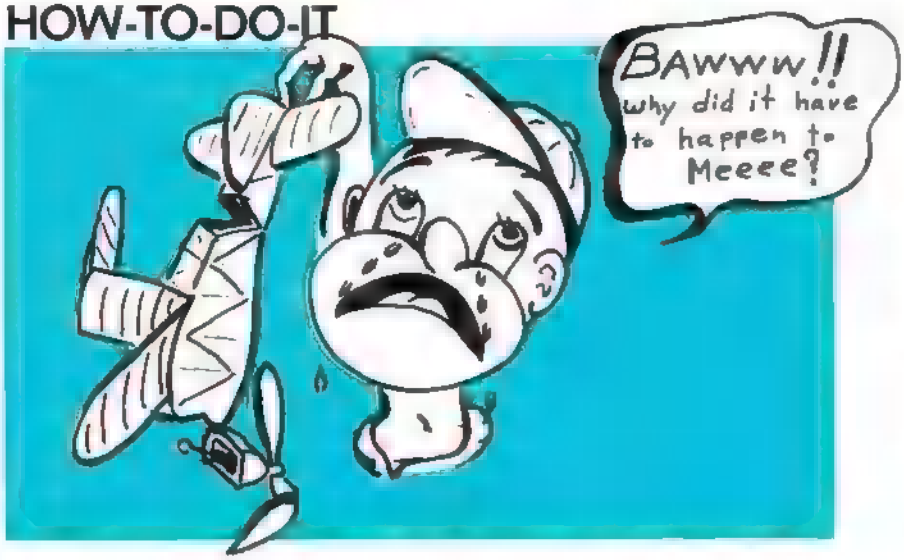
You will need two pieces 20" long and 16" wide. Lay one piece flat on your bench, butt the second piece to the first and block one end up to obtain the dihedral angle shown on the plans. When it's about right, staple the two boards together so that the top surfaces are perfectly flush at the joint. A bead of glue along this joint will "lock up" the boards for sure.

After all this, the actual construction begin by edge gluing four wing skins together. We glue up so that the bottom skin joints are parallel with the rear spar and the top skin joints are parallel with the leading edge which provides a sort of cross-grain construction in the finished wing.

Our favorite method of gluing the sheets is to first run masking tape over all joints in one panel, opening the reverse side of the joints, and brushing a light coat of "Starcrest" coating resin in the joints, then laying the panel out flat with the taped side down. In two hours, the joints are ready for sanding. (A word of caution: only "Coating" resin. Starcrest makes other resins, such as laminating resin, but only Coating resin is easily sanded.) Final sand one side of each panel making sure that the bottom surface of the two bottom panels and the top surface of the two top panels are sanded.

Continued on page 56

After year of Formula I racing this Ole Tiger, finds he hooked on left turns and said: "We've had much more fun in Formula I racing than when winning a pattern event."



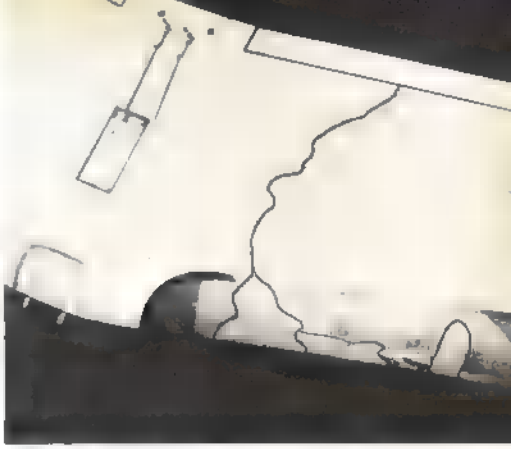
Repair and Fly Again

If it is fixable, here's what to do after a crash.

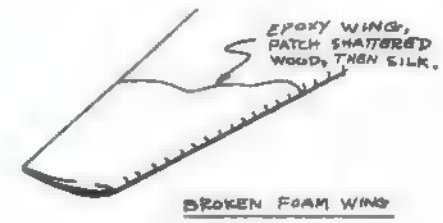
JERRY LEAKE
PHOTOS AND DRAWINGS BY AUTHOR

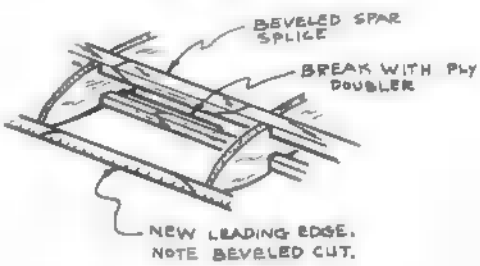
WELCOME to the fraternity of model builders, flyers and crunchers. You have just joined a universal club — active world wide. One thing you can count on so long as you fly model airplanes is that, sooner or later your little jewels are going to get fractured, broken or completely mutilated. Somehow the law of averages applied to model airplanes decrees that if you fly, you repair. What goes up must come down. It's that simple.

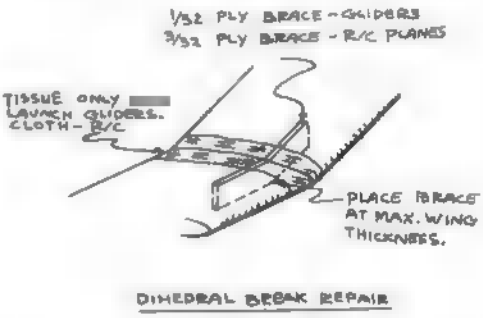
Repair of models is learned over a long period of time; it is directly proportional to how much you fly. Each modeler is an expert in repair in his own field and if you've been in this hobby for any length of time, you have literally hundreds of techniques and special ideas on how to repair. But what about the newcomer to the hobby, the neophyte who has transferred from stick model to U-control or to radio-control, the man who built models 20 years ago and is just getting back into the hobby or worst of all, the junior who is just starting? These are the modelers who kind of bumble along, patching and repairing without any real idea of whether the repair is good or bad. Too often, we have seen wings fold in the air, engines fall out or stabilizers loosely hanging on by the tissue as a bomb careened towards the sky and then the ground. The following paragraphs can't possibly cover all types of repair. It would take a very large book. However, a few of the basic principles can be presented so that you as a modeler can better understand why a repair

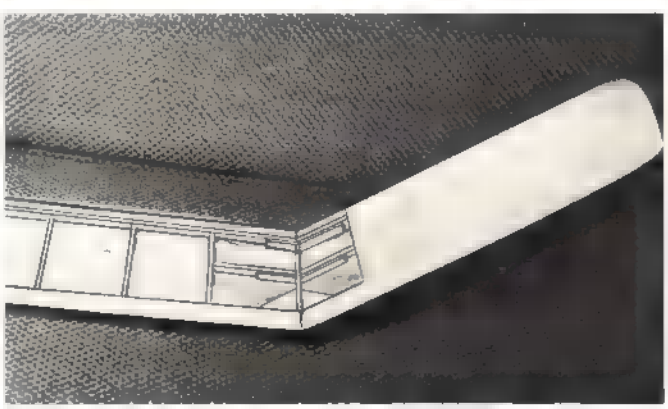


Fix foam-core wings by joining with epoxy glue, replace shattered balsa, and re-finish.

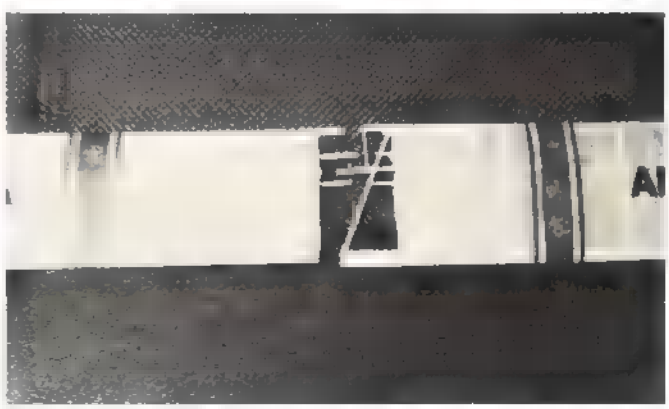




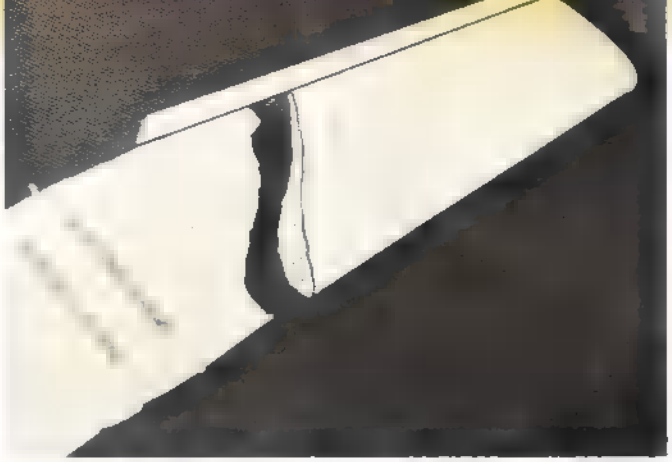




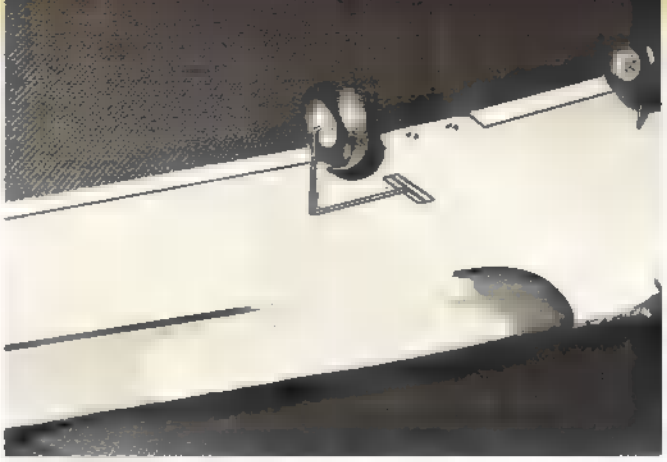
Dihedral break on built-up wing requires new 1/32 ply joiners and balsa gussets. Use regular model cement; it is lightest when dry.



Suppose the glider wing just cracked in two. Splice spars with beveled edges and fish-plates. Keep it aligned on flat surface.



When foam wing breaks this neatly, you [illegible] epoxy the joint, smearing glue into the wood, then silk over break and re-finish.



The landing gear ripped out too. When fixing, the torque box was reinforced with spruce block to distribute the force loads.

is made the way it is. Reasons often differ.

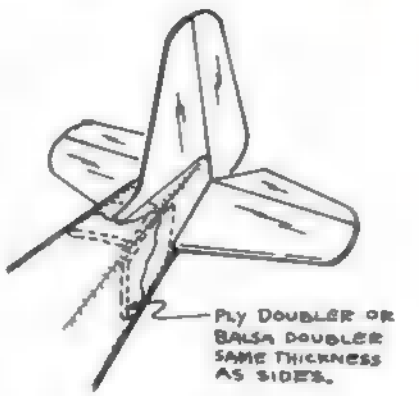
The foremost important point to emphasize is strength. When a model is bashed, it usually must be repaired stronger than when it was new. This is because the wood has small internal fractures not readily apparent to the naked eye. For example, butt gluing two pieces of wood together with an epoxy or glue which is advertized as "Stronger than the Wood Itself" will not provide a safe repair since the wood is also fractured beyond the break — internally where you can't see it. An internal doubler such as doweling or external doubler such as sheet balsa or plywood is needed to pass loads well past the break. With limitations, a beveled joint can accomplish the same thing by distributing loads over a wider glue joint.

The next most important point to emphasize is lightness. Don't use steel, where aluminum will do the job. Don't use $\frac{1}{8}$" plywood where $\frac{1}{32}$" plywood could do the job. A hand-launch glider flies lousy if it weighs 4 lbs., so does a 19-powered R/C that weighs 6 lbs.

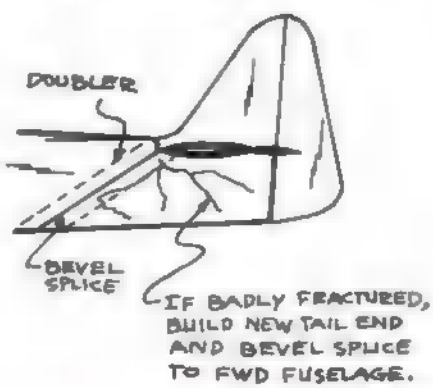
The third point is glue. Types of glue also vary in weight. Don't use epoxy where a model cement such as Aerogloss will do. By the same token, don't use Aerogloss around motor mounts and firewalls. You need the epoxy to fill the voids and provide continuous bonding throughout the entire joint. Model cements have solvents which evaporate as the cement dries. Air bubbles are formed which prevent a continuous bond, also the cement shrinks and it may not have wetted the entire area adequately. Speaking of wetting, that is the reason double gluing is emphasized in building. Coat each piece with the glue (except epoxy), rub it into the grain and let it get almost dry (this ensures that glue has penetrated the entire surface), then apply a second coat and join together. When the second coat of glue is applied, the solvents dissolve the first coat slightly, thereby ensuring a good bond. When gluing with epoxy, don't just dab it on, spread a small amount over the surface and rub it into the wood as much as possible, then apply some more and join the pieces. Epoxied joints as a rule don't require clamping; however, cemented joints should be held together as tightly as possible. Glue strength is associated with the thickness of the glue line; the thicker the glue line, the weaker the joint. The larger the area, the stronger the joint. Beveling the wood is a way of increasing the bonding area without adding doublers and increasing the weight.

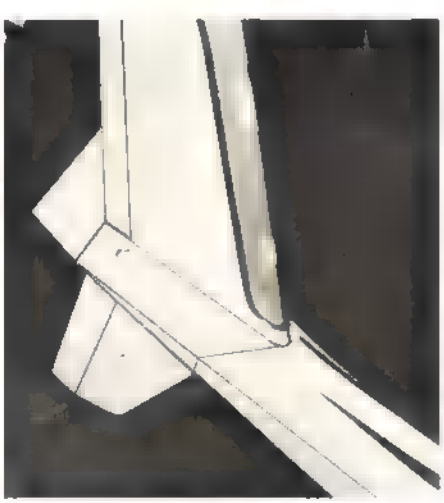
White glue and aliphatic resins, such as Franklin Titebond, are very strong but still require double gluing; however, they are not fuel-proof like model cement or epoxy. Don't use water soluble glues around motor mounts and firewalls. Once a crack forms and gas or oil penetrates, the glue line disappears very rapidly. I'm sure you don't want your firewall to fall out just as you are demonstrating your little jewel to the locals. White glue and Titebond are good for general structure on all types of models. The glue is heavier than model cements, so use sparingly if you're building a glider or free-flight. One nice thing about water soluble glues is that they can be used to repair painted structures without damaging the finish. The excess glue can be wiped off with a damp cloth.

Contact cements can be used whenever



BROKEN FUSELAGE REPAIR





To repair broken tail, splice new balsa with old at an angle. Use balsa doubler inside.

Use toothpicks as doweling to splice together broken fuselages or wings on profile gliders.

Here a plastic R/C job was repaired using inside doublers; then inside was foam filled.

bonding large flat surfaces together; however, don't expect to obtain any great strength from the bond since contact cements are usually slightly rubbery. Contact cement is useful for gluing fuselage side doublers together since it doesn't cause sheet balsa to warp. Again it is not fuelproof, so don't use contact cement around firewalls. Don't ever glue a firewall to a sheet which is contact-cemented to a fuselage side sheet. It just won't hold; the glue stretches and the sheets split as vibration works the joint to death. Thinned epoxy is the best for gluing flat sheets. Epoxy can usually be thinned with denatured alcohol. Check with the manufacturer to be sure of the best thinning agent.

While you stand sobbing softly over your broken pieces, ask yourself a couple of questions. Are the broken areas structural load carrying members, or are they just for shaping such as wing leading edges, ribs, or trailing edges? Does the structure have to stand high impact, such as glider fuselages? High impact, ho-boy, we all know about that one! That's when somehow the ground is relocated about 3 ft. closer to your airplane than necessary and then some wise guy says "Gee, it doesn't fly very good, does it?"

On with the questions. Does this thing have to be kept light or can I sacrifice a little weight for strength? Should I add doublers of plywood or balsa? That one depends on whether you're repairing wing spars or fuselage sides. Of course, you also have to decide what kind of glues to use in each area that is going to be repaired, epoxy for motor mounts and firewalls, or high load carrying structures such as dihedral braces or landing gear mounts, model cement for light structures such as fuselage sides or wing sheeting as found on R/C airplanes.

Another question to ask yourself is, "Can doweling be used?" This is a very useful tool which is often overlooked. Glider fuselages can be repaired very effectively with flat or round toothpicks inserted in the center of the break. Dowels can be used to retain firewalls to fuselage sides, even when the wood gets a little oil soaked. If doweling is used, the hole should be drilled the same size as the dowel. The dowel should be spiral-grooved so that excess glue can escape the hole. This is not too important if doweling two pieces of balsa together, but if doweling into plywood, the dowel must be grooved or it won't drive in as far as it should. Balsa is porous enough for the glue to diffuse around the dowel into the balsa. Use as large a dowel as possible, usually a diameter which is ½ the thickness of the repaired wood.

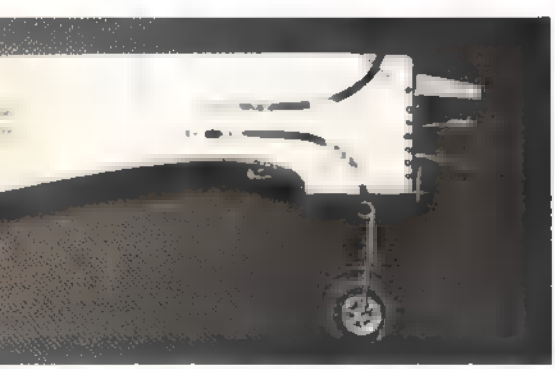
Foam structures such as wings can be repaired very easily, even when badly damaged. Simply spread epoxy (never model cement or white glue) over both pieces, butt together, wrap with a piece of Saran Wrap, lay a hefty straight edge on each side to hold the wing straight and wrap with tape or rubber bands until dry. After the joint is dry, cut out the shattered balsa and splice in new balsa across the foam joint. Put a little Epoxolite or plastic balsa in the dents, let dry, sand smooth and then apply silk over the whole repaired area and repaint. The repair will be almost impossible to detect. To repair dented loading edges, just smear a glob of Epoxolite (great stuff) into the hole, lay a piece of Saran Wrap over the patch and grab a rolling pin or large dowel such as a broom handle, pretend you're rolling dough and roll the Epoxolite out until it has feathered in all around the dent. Let dry, remove the Saran Wrap, silk and paint. The rolling pin provides a good even surface which matches the curvature of the wing. If not enough Epoxolite was applied the first time, fill the dents and repeat the whole process.

Dihedral breaks in built up glider wings can be repaired by blocking up the wing to correct dihedral and tracing out the angle onto a piece of 1/32" plywood. Glue the plywood brace along the spars, leading and trailing edges, then glue some light silk over the joint, sand smooth and repaper. The joint will never break again; the wing might, but not the joint. Solid balsa wings can be repaired with a 1/32" plywood dihedral brace or just by wrapping and gluing the joint with light silk. A silk repair is the lightest, but plywood is of course the strongest. Broken spars or fuselage longerons can be repaired with a doubler the same weight as the structure or with a 1/32" plywood doubler on each side of the broken stick. If replacing a portion of a stick, leading edge, etc., bevel the wood such that if you push on the wood, it is pressed tighter into the structure. Don't butt glue and splice, it's too heavy and not strong. When repairing sheeted structures, cut out the fractured wood, bevel the wood 45 degrees around the entire cutout, then lay a piece of paper over the hole and rub a pencil all along the cutout marking the shape on the paper. Cut the new patch of wood to size using the paper as a template, bevel the edges to match the cutout and glue in place, then refinish the area. The beveled cutout is especially useful in repairing sheeted wings since it doesn't require a doubler glued to the inside of the wing.

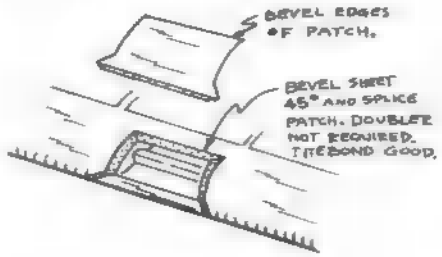
Fuselages and tail assemblies have a way of parting when the ground comes up and strikes them. Usually the tail section of the fuselage is shattered. The entire aft end should be rebuilt by cutting out all shattered wood and attaching a new assembly with a long beveled joint, never a butt joint. A balsa doubler should be applied along the entire splice. It can be either 1/32" plywood or wood the same thickness as in the structure. To align the stab, draw a line parallel with the wing chord plane and project it down onto the new structure. Measure the location and incidence for the stab and fin and then whittle out the excess wood until the stab and fin can be fitted into position. Don't forget to ensure that the fin is aligned straight. Add a doubler under the stab area to provide extra bonding surface, then glue the stab and fin to the fuselage. Add a little plastic balsa where needed; sand and silk the patched areas, paint and go fly again.

Fiberglass repair is possibly the messiest. First sand the area with 220 sandpaper, both inside of fuselage and outside. Then a neat fiberglass repair can usually be done by just butting the whole mess together and smearing the area with resin. Apply a layer or two of 5- to 10-oz. cloth to the inside of the fuselage with a generous amount of resin. Apply a layer of 3-oz. cloth or lighter over the outside of the joint and let dry. Sand with 220 paper again and smear some Epoxolite or equivalent over the seams and edges, wet sand with 320 and refinish. Fiberglass or wood fuselages must be firmly held together while the repaired joints dry. One to 2" wide masking tape is extremely useful in this respect. Clean the area thoroughly with soapy water or acetone and let dry. Repair the area, then wrap the whole assembly together with the tape. Clean off all excess glue or epoxy which may squeeze out of the joints. If it doesn't, you don't have enough glue in the joints and you better tear it all apart and reglue again. Don't worry about gluing the tape to the structure — it will come off. However, you will have to sand off any glue ridges which appeared along the edge of the tape.

I hope the preceding paragraphs have given you some ideas and started you thinking about repairing some of those old clunkers laying around the basement instead of just building new ones. A little judicious repairing will bring forth many a broken bird and allow it to go soaring safely in the heavens once more.

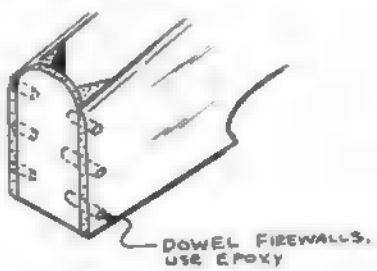


Quarter-inch firewall refitted with ⅛ dowels for bracing. Use lots of epoxy.

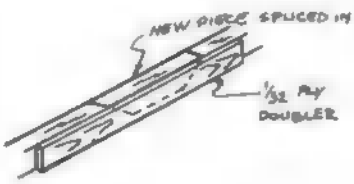


CRUSHED LEADING EDGE REPAIR

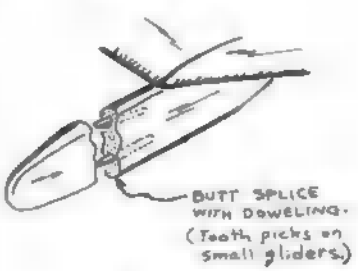
FOAM WING REPAIR



FIREWALL REPAIR



LONGERON REPAIR



GLIDER REPAIR

PUSH-AIR

Patterned after the old Curtiss-Wright Junior, Push-Air is an extremely stable, slow flyer, thanks to its parasol wing. The wee engine is merely cemented to the firewall, above, right. The firewall cements to the trailing-edge center-section. No bolts — not even fuel-proof cement needed. Below: CO_2 containers are hidden in spacious nose.

For the new Brown Junior .005 CO_2 engine, a wee cutie that can be flown in parks — or even indoors!

FRANK EHLING

CO_2-powered models are not new. Herkimer and Campus once mass-produced such engines, and CO_2 power was once a National contest event. The model shown here was made overnight to demonstrate a new motor.

Now Bill Brown, of the famous Brown ignition engines of the 1930's and early 40's, has come up with another winner — a tiny "mill" called the Brown Junior .005 CO_2. Its displacement is .005, or 1/200 cu. in. Weight is 1/10 oz. with hardware. The engine can be

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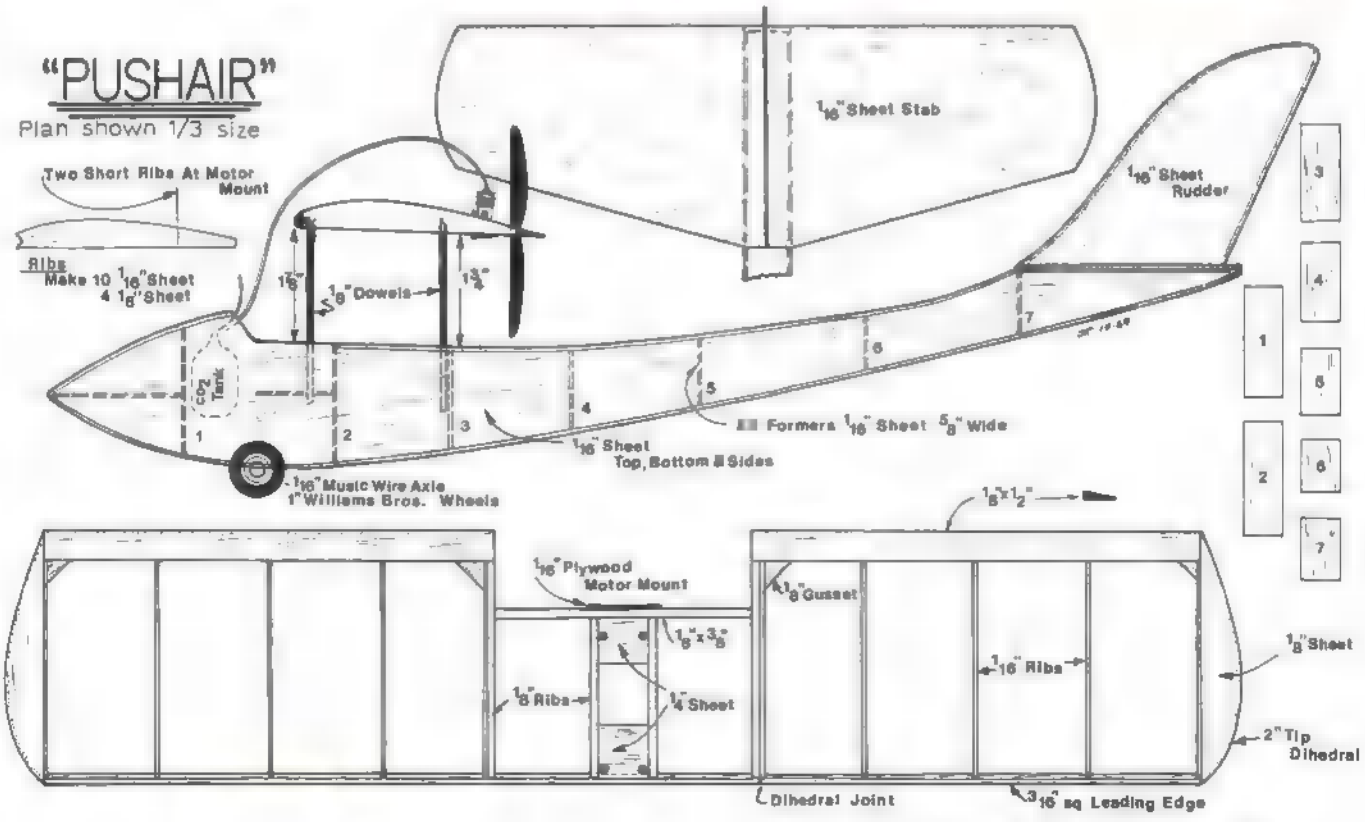
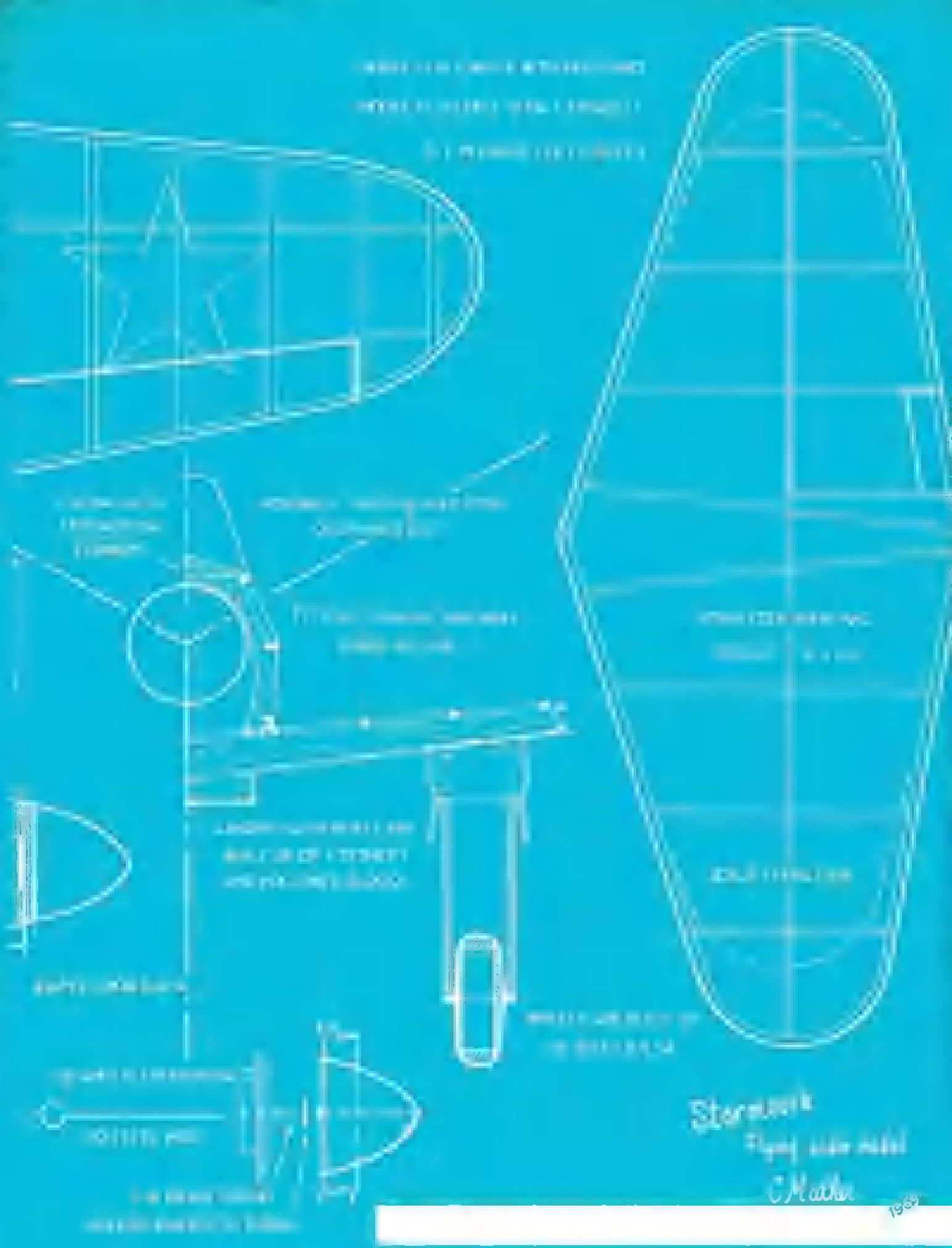




STORMOVIK

Sleek Russian tank-buster from WW-II is attractive rubber-powered scale model. Makes 90-second flights from ROG.

CLARENCE MATHER

THIS sleek, Russian anti-tank aircraft of World War II presents a striking appearance in white winter camouflage and red insignias. It also flies well, so you can understand why it is my favorite model! It weighs ¾ oz. ready-to-fly and does 90 seconds ROG (Rise-off-ground). It is built light, yet strong enough to support its thin coat of color dope. The dope and scale details give a very realistic appearance. The Stormovik is flown indoors, or outdoors on quiet mornings and evenings.

Construction techniques are typical for stick-and-tissue models with round fuselages. Such models require considerable building time but a scale modeler should enjoy the building as well as the flying! Sheeted areas, landing-gear boxes, and cowl scoops should be made of the lightest wood available. Wing spars, body stringers, and formers need to be of wood that is light yet has some feeling of strength. The prop should be of very hard balsa or spruce.

For cutting thin strips obtain a metal, or a long steel ruler straight from a sheet-metal shop. Aluminum, 1/40 x ½ x 18", works fine. Sand the edges smooth. Thin razor blades (not stainless) can be broken to a sharp point for cutting. Titebond glue is recommended for its low-shrinkage property. Squeeze some into a bottle, add a few drops of water and mix. Apply to each edge of a joint with a sharpened stick. Soft, fiber insulation board works quite well for model assembly. It is fairly rigid yet pins push in easily. Assemble the complete plan on the work board, protected with Saran Wrap or wax paper.

Build up a fuselage half-shell right over the plan. Cut or bend the top and bottom stringer to shape and hold in position on the plan with pins. The fuselage formers should be notched, after they are in vertical position on the plan. Sighting along the assembled formers will allow notching, so that the stringers take a smooth curve. Add all of the stringers while the half-shell is on the plan.

Form the stringer to the fuselage curves by soaking in water and bending over a hot light bulb or soldering iron. Remove the half-shell and assemble the other half of the fuselage. Sand the formers flat between the stringers. Widen the top stringer at the rudder position and sheet-in the various areas. Do not attempt to shape the wing position area until the completed wing is available for accurate matching.

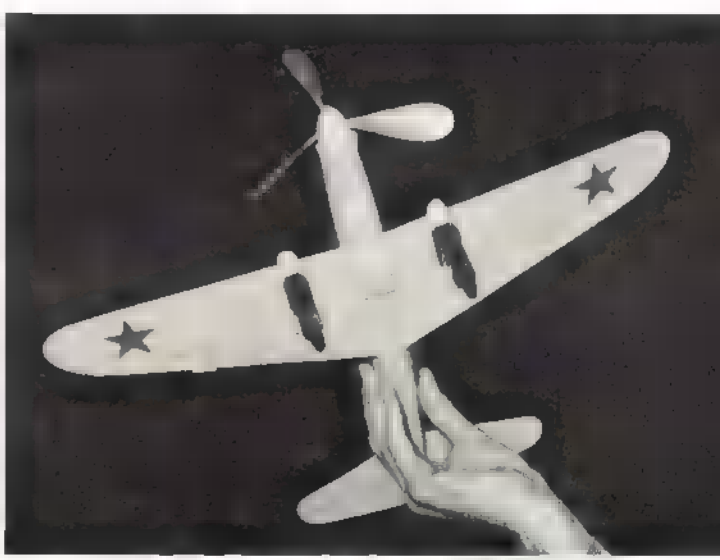
The wing, stab, and rudder outlines can be formed like the stringers. Or the soaked balsa can be bent around a form made of ⅛" wood. Pulling the wood around the form reduces the chances of kinking. Brush extra-thin glue between the strips and the resulting outline is generally neater, lighter, and stronger than the sheet balsa type. The wing is built as two separate panels, then joined at the dihedral angle. First, pin the outline in position, add the 1/32 x 1/16" rib bottoms, then install the spars upright in place, and finally cap the ribs. Make a rib pattern of 1/32" aluminum and use to cut the numerous rib caps. Cut off the rear of the ribs to shorten. Fill in the spar-rib areas flush with the surface where the fuselage formers and the landing gear boxes touch the wing.

Observe the completed wing frame for warps. Ideally, the right panel will be flat and the left trailing edge will be down about 1/16". If not, hold the frame over boiling water and twist into position. After covering the wing with light-weight tissue and shrinking the tissue, repeat the above process.

The covering process should begin by carefully smoothing the wood with fine sandpaper, then applying two coats of thin dope to surface wood — 1 oz. of nitrate dope or clear lacquer, 1 oz. of lacquer thinner, and 8 drops of castor oil. Cut a piece of tissue that will conform to the chosen area, and hold in position. Brush thinner around the edge of the tissue and wood. The precoated dope will soften and stick the tissue. Addi-

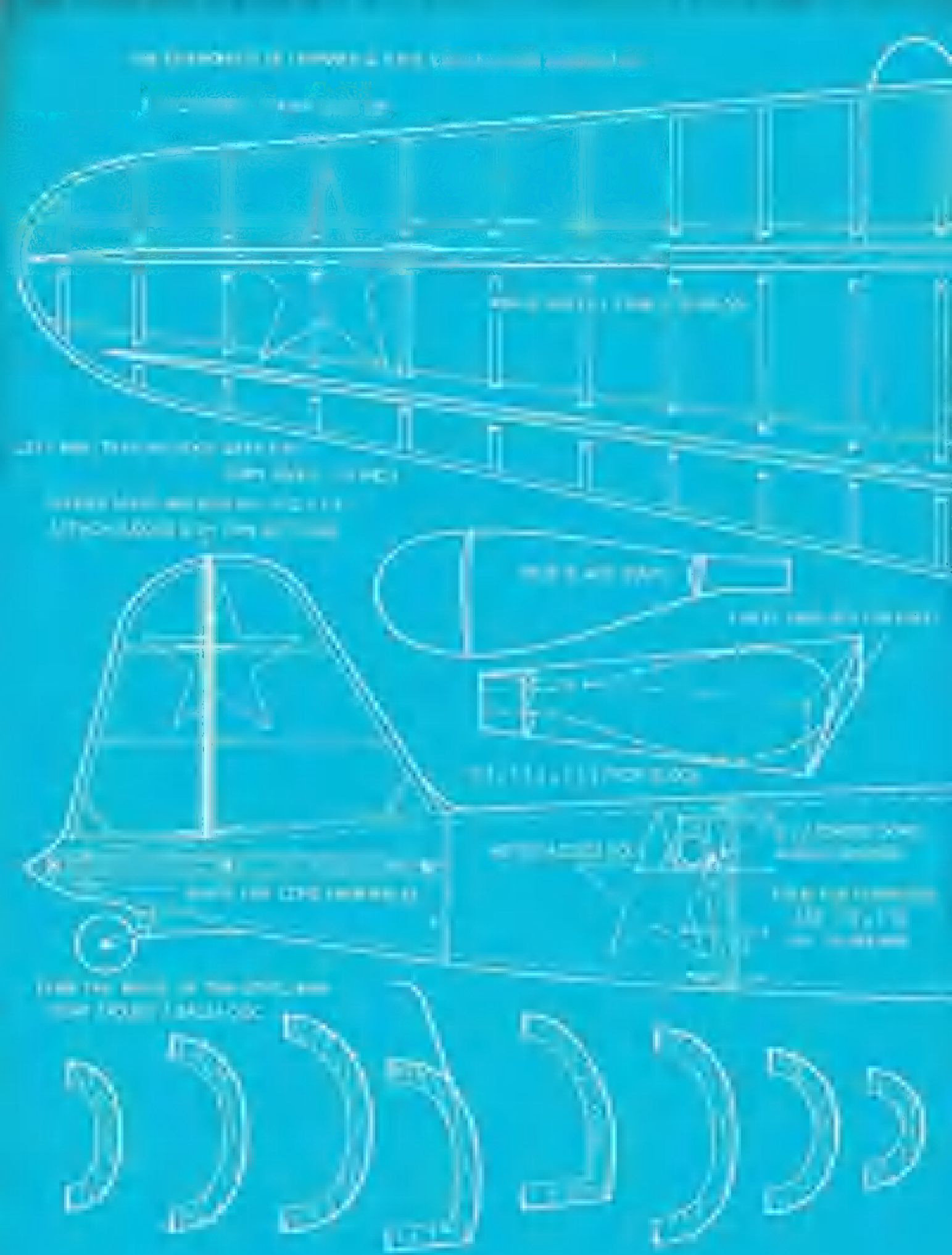
Continued on page 62

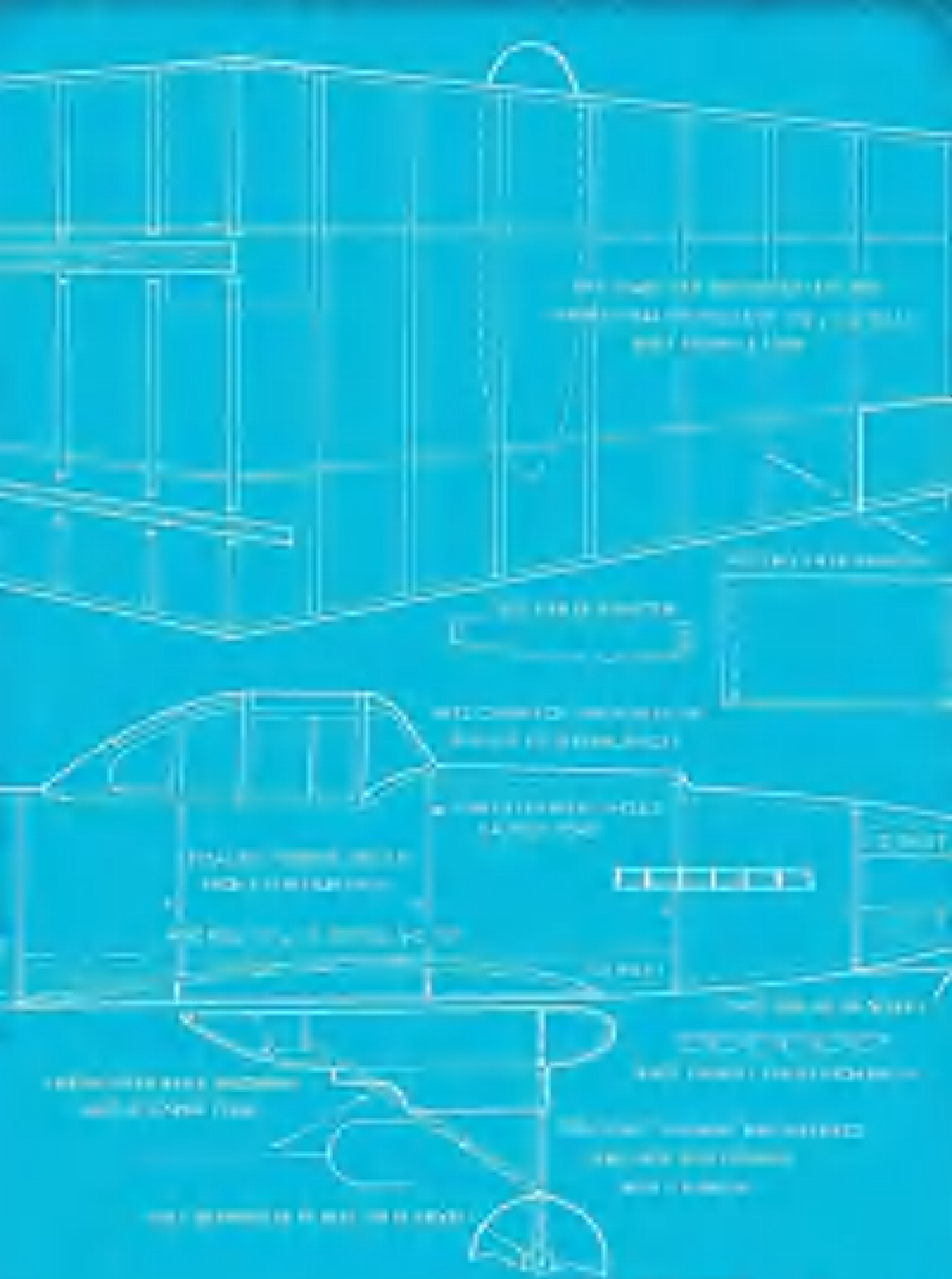
In modeling this unusual Russian aircraft, few modifications were needed. Long nose and long wing are perfect for rubber power. Painted all-white.



Both, Fudo Takagi.

Make your working plans from these full-size plans by tracing, or carbon-copying the parts and outlines, then splice together.





CLASSICAL GAS

Stunt ship with traditional lines offers simplicity and good windy weather flying.

CLARENCE HAUGHT

CONTROL-LINE stunters fall into two general categories, the modern [redacted] jet type aircraft and the traditional or classic style. After building and flying both types, I feel the classic designs provide a more realistic comparison to full-scale national and international competitive aerobatic machines. I don't mean to imply that jet aircraft [redacted] not good pattern flyers, but there is just something about the specialized aerobatic machine performing a precise pattern in close view of the spectators. With the foregoing in mind, the "Classical Gas" was designed along traditional lines.

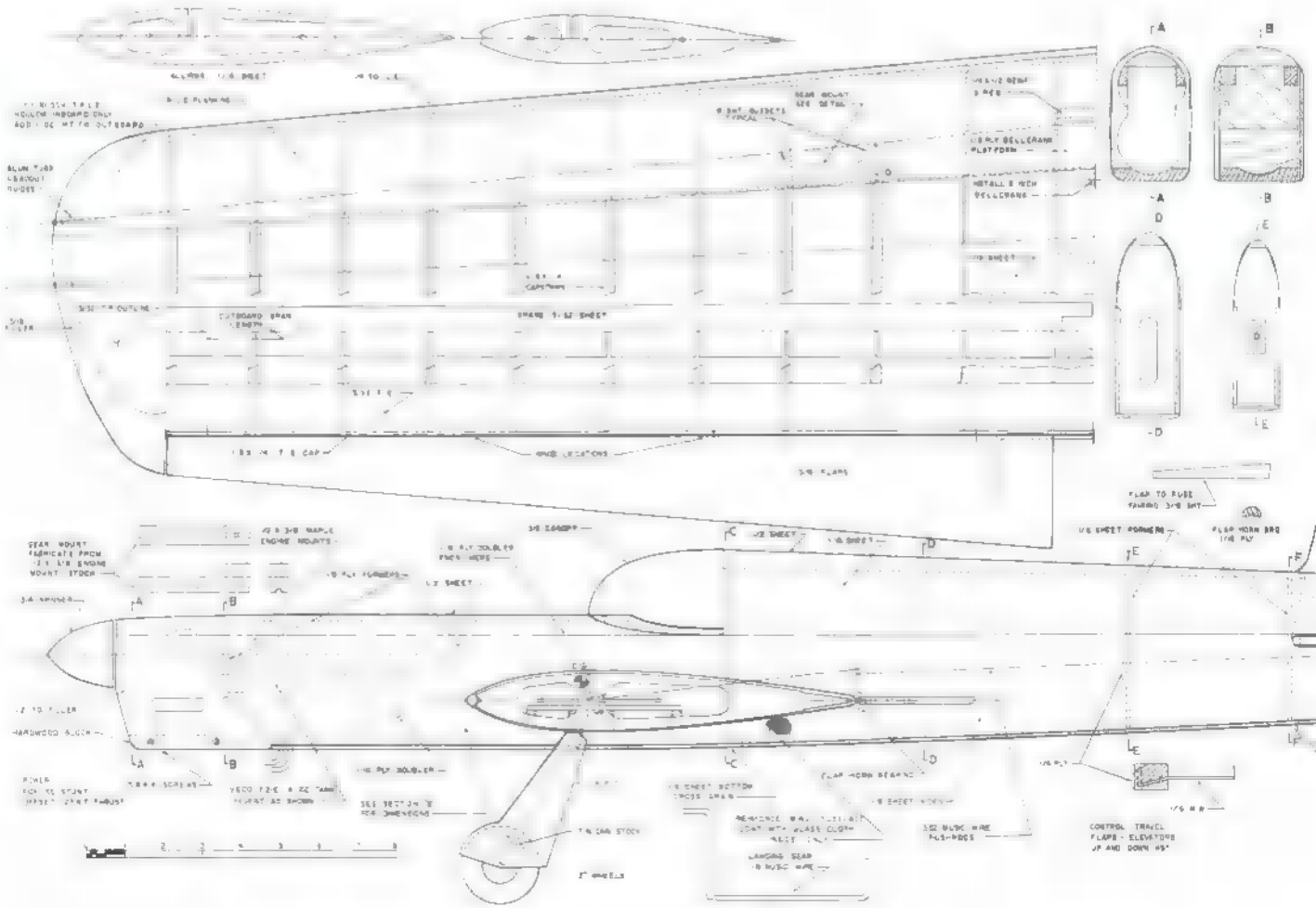
This design is primarily intended for the stunt flyer graduating from the Ringmaster or Profile stunter stage to the full competition ship and as such has certain design features to make this transition easier.

First of all, a 15% airfoil [redacted] utilized rather than the usual 18%. This is based on the premise that a 15% section will give a maximum lift, minimum drag characteristic. Any increase in thickness above this will only result in increased drag. Most advanced stunt flyers utilize the thicker section for a slower airplane [redacted] the sacrifice of penetration. The advanced flyer avoids stalls, mushing, and engine troubles that plague the beginning stunt flyer, preferring the slower speed for a smoother-appearing flight. The beginner, however, is used to the faster profile stunt trainer and will find the Classical Gas considerably slower. Yet it has the speed for excellent penetration to assist him out of those awkward spots in which he so often finds himself. Increased penetration can also be a valuable asset in the wind where the slow ships seem to be [redacted] susceptible to being blown out of overhead maneuvers.

Other features making this an ideal design for an "advanced trainer" are removable landing gear for ease in realignment after hard landings, a simplified cowling system, and the absence of fillets and wheel pants. The exotic wheel pants seen on many stunters today are beautiful to look at but are impractical for use in grass where the novice should be flying. The plywood gear covers used [redacted] the Classical Gas are simple, rugged, and completely compatible with grass fields.

If you've ever carved a balsa cowl for a stunt ship the cowling system on this ship should be a welcome relief to you. It is strong, maintenance free, yet provides ample access to the engine and has the side benefit of providing a generous supply of cooling air flow around the entire engine.

If there is one thing that construction articles for stunt ships have in common it's got to be the warning about selecting light wood. I'd like to go a step farther here and emphasize the fact that it is absolutely imperative that you build light. The original ship weighs [redacted] oz. However, I'm sure it would weigh over 50 oz. if I had not been weight-conscious at every turn. If you must order your wood by mail, by all means purchase contest grade balsa. If possible, sort through the wood at the hobby shop and select the light-



Author's son, David, shows how to start the inverted engine. Here's the trick — draw fuel to the carb, attach battery, prime by wetting piston with exhaust port closed, then flip.

est wood you can find while not sacrificing too much strength. I like to make weight saving a little game. You would be surprised what alternates you can come up with. It will pay off with better patterns, tighter cornering, and longer life.

Construction should begin with the wing and stabilizer assembly ■ these components should be complete before they are installed in the fuselage and become an integral part of the airplane. Begin by transferring the inboard and outboard rib patterns onto ■ suitable template material such as $^1/_{16}$" plywood, aluminum sheet ■ tin from an old fuel can. After cutting the templates to shape and drilling the alignment holes, stack twelve $^1/_{16}$" sheet rib blanks between the templates and secure them with two round-head stove bolts. Now with ■ sharp knife and a sanding block, half the ribs can be formed at one time. The spar and leading edge notches, and trailing edge relief may be cut with a file. I hollow the ribs for the inboard wing only to allow for leadout passage. Repeat the above process for the other wing panel.

Cut the spars from medium $^3/_{32}$" sheet and notch for ribs with a fine-tooth hack-saw blade or the edge of a thin file. Trailing edge width was held under 1$^1/_2$" to allow truing up a 3" sheet and cutting both trailing edges from it. If possible, obtain 48" wood for the trailing edges. If you must splice, alternate splices, and splice over a rib. Slip ribs into spars but do not glue yet.

Pin one trailing edge down to plan and glue ribs ■ trailing edge using white glue. I prefer this type of glue over conventional model cements, as it allows you a little more time to get things lined up. Add the upper trailing edge and the $^1/_4$" square leading edges. When dry, unpin wing from plan and block up leading and trailing edges so centerline of leading and trailing edges are parallel to and equal distances up from the building board. The spar butts should be touching the board but the tips will be up from the board. Remember this wing tapers ■ thickness as well as plan form. The spar is now glued to the ribs and the bellcrank ■ with a 3" nylon bellcrank installed is added. Nylon bellcranks are preferred as they do not require bushings for long life. Leadouts should be flexible cable and will exit under the tip outline as shown on the plans. Add the $^1/_8$ x $^1/_4$ trailing edge cap.

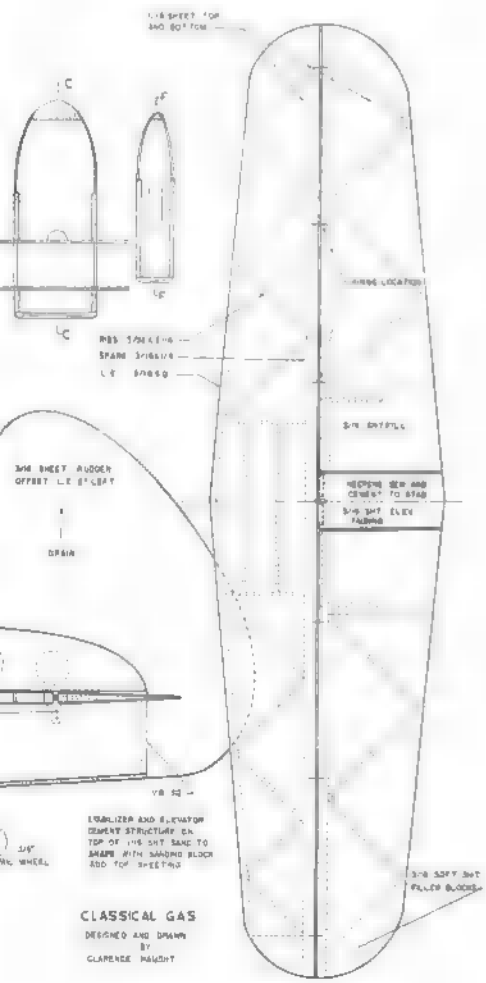
While all this is drying, fabricate the landing gear mounts as shown on the plans using engine mount stock. The groove may be easily formed by first slitting the wood with a saw and then gouging out the groove with a piece of $^1/_8$" piano wire with a square end. The mounts are attached as shown on the plan. Use plenty of gussets and they won't give any trouble. The gear wire is retained ■ the blocks with two No. 4 x $^3/_8$ sheet-metal screws and large washers. The removable gear is handy when transporting or packing the model as well as being easy to realign if it becomes sprung. It is also easy to adjust when experimenting with wheel position for grass ■ Macadam flying fields.

After the wing has dried, the upper leading edge planking may be added while the wing is still anchored to the board. You may want to moisten this on the outside to facilitate bending. When this is dry the wing should be turned over and anchored to the board again to add the bottom leading edge planking. Note that the planking butts against the $^1/_4$" square leading edge. This may seem like a lot of extra work, but the warp-free wing produced by this method is well worth the trouble.

The flaps are cut from $^3/_{16}$" sheet, sanded to shape, and joined with a good control horn. You may want to bush the horn for long life. Brass tubing or Teflon works equally well in this respect. By all means use ■ sort of horn support, either the plywood bushing shown on the plan or the spring bearings that come with some horns.

Sand the trailing edge cap to the finished

Continued on page 64



Even advanced trainers should be simple and convenient. Torsion-bar landing gear is removable and adjustable. Engine completely accessible by removing bottom cowl part.

Spinks Akromaster

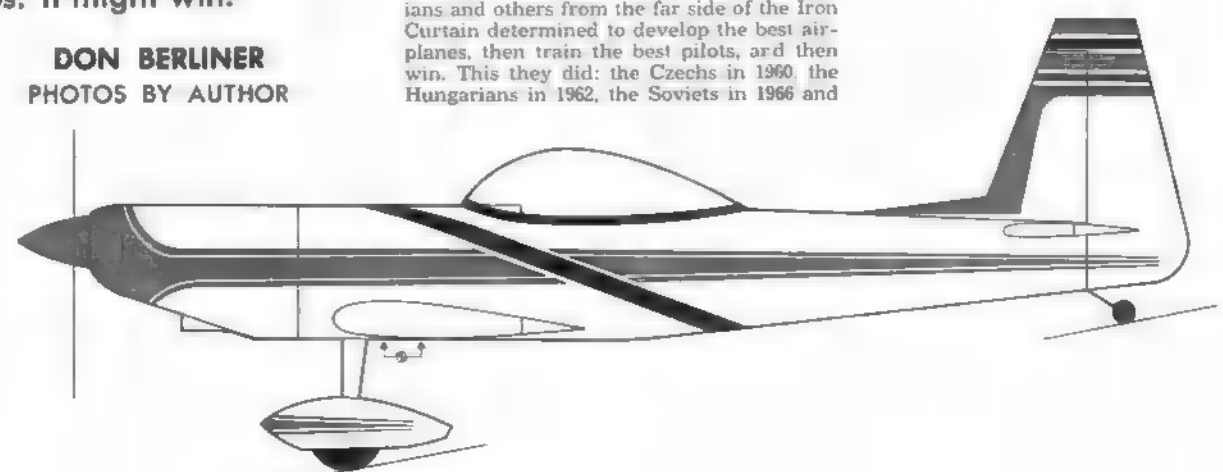
Designed to win acrobatic competitions, this plane may be with the U.S. team next summer at World Championships. It might win!

DON BERLINER
PHOTOS BY AUTHOR

IN big-time aerobatics competition, a pilot [redacted] no better than his airplane. Given the proper equipment, any of a dozen or more entrants in the 1970 biennial World Aerobatics Championship in England could come home the winner. Without a top-notch aircraft, not even the finest pilot stands much of a chance.

Right from the start of world competition in 1960, the Czechs, the Soviets, the Hungarians and others from the far side of the Iron Curtain determined to develop the best airplanes, then train the best pilots, and then win. This they did: the Czechs in 1960, the Hungarians in 1962, the Soviets in 1966 and the East Germans in 1968. The Spaniards slipped through in 1964, but they flew Czech airplanes.

Occasionally, an individual may win a major contest by a series of performances far beyond his usual and never to be duplicated, but a team victory is another matter entirely. The results in the first five World Aerobatics Meets were based on long term plan-



Ever so often a real plane appears which catches the fancy of all modelers. This one should prove popular because it looks like a big model and has easily followed shapes and lines. An exact scale ship would even make a fine R/C pattern or C/L stunt job. Its airfoil is symmetrical. Rudder and stab are large, nose and tail are well balanced.

ning and training. In all cases, it was the home team that won, thanks to hundreds of hours of practice at the contest site by a carefully selected group of pilots whose sole occupation for many months was aerobatics. And thanks to specially designed and developed aerobatic aircraft which established a new standard of performance in a very old field. The various Yak-18s and Zlin Treners and Akrobat Specials came into being for one purpose: to win.

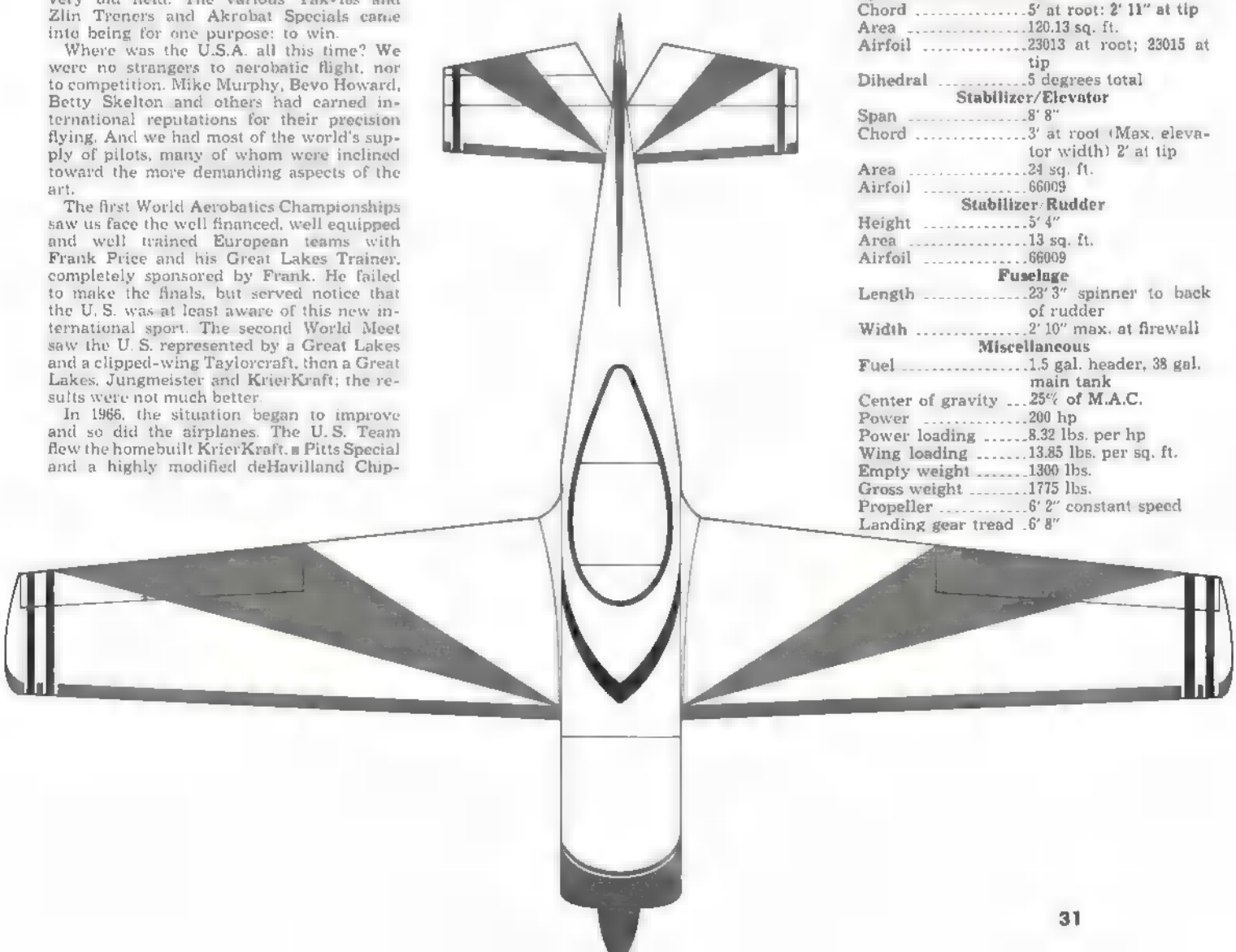
Where was the U.S.A. all this time? We were no strangers to aerobatic flight, nor to competition. Mike Murphy, Bevo Howard, Betty Skelton and others had earned international reputations for their precision flying. And we had most of the world's supply of pilots, many of whom were inclined toward the more demanding aspects of the art.

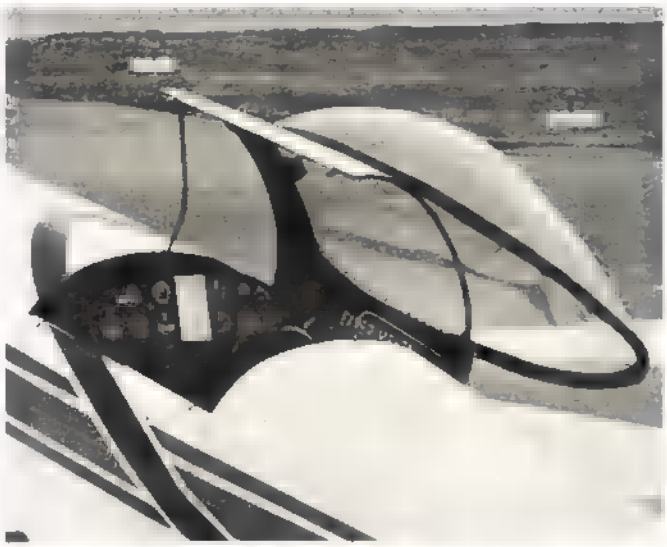
The first World Aerobatics Championships saw us face the well financed, well equipped and well trained European teams with Frank Price and his Great Lakes Trainer, completely sponsored by Frank. He failed to make the finals, but served notice that the U. S. was at least aware of this new international sport. The second World Meet saw the U. S. represented by a Great Lakes and a clipped-wing Taylorcraft, then a Great Lakes, Jungmeister and KrierKraft; the results were not much better.

In 1966, the situation began to improve and so did the airplanes. The U. S. Team flew the homebuilt KrierKraft. ■ Pitts Special and a highly modified deHavilland Chip-

AKROMASTER SPECIFICATIONS

Wing	
Span	30'
Chord	5' at root; 2' 11" at tip
Area	120.13 sq. ft.
Airfoil	23013 at root; 23015 at tip
Dihedral	5 degrees total
Stabilizer/Elevator	
Span	8' 8"
Chord	3' at root (Max. elevator width) 2' at tip
Area	24 sq. ft.
Airfoil	66009
Stabilizer/Rudder	
Height	5' 4"
Area	13 sq. ft.
Airfoil	66009
Fuselage	
Length	23' 3" spinner to back of rudder
Width	2' 10" max. at firewall
Miscellaneous	
Fuel	1.5 gal. header, 38 gal. main tank
Center of gravity	25% of M.A.C.
Power	200 hp
Power loading	8.32 lbs. per hp
Wing loading	13.85 lbs. per sq. ft.
Empty weight	1300 lbs.
Gross weight	1775 lbs.
Propeller	6' 2" constant speed
Landing gear tread	6' 8"





Akromaster is a fairly large plane compared to most home-builts. Cockpit is comfortably wide single-seater. Bubble canopy provides total visibility. Fuselage taper begins aft of the cockpit.

This instrument panel is obviously designed for aerobatics work. Aresti symbols show the 25 free-style maneuvers flown by Charlie Hillard at the U. S. Nationals. Can you follow the pattern?

munk that year, and we started to attract attention as more than a curiosity. The 1968 meet saw the team equipped with a newer Pitts, two Chipmunks and a modified Bucker Jungmann; we finally became contenders.

Against this motley collection of home-builts and antiques was arrayed a vast line-up of orderly Zlins and Yaks, all neatly painted in national colors and numbered. The contrast made by our flying circus wagons was hardly diminished by the steadily improving ranking of the team. From the bottom of the list we had risen to third in the world. The team had gone to East Germany in 1968 with little hope of winning — it returned convinced that only east-west politics had kept Bob Herendeen from the individual title and the U. S. Team from almost as high a placing.

The Pitts Special and the extensively modified Chipmunks of Harold Krier and Art Scholl had proven themselves capable of the most demanding of championship aerobatic routines. But they were not yet the ultimate — an airplane designed for competition was still needed. An airplane based on the years of world and national experience that could bring the U. S. its first triumph in international competition.

In September 1968, just a few weeks after the fine showing of the U. S. Team in East Germany, there occurred the first flight of what may prove to be the airplane we have been looking for. An airplane designed from the tires up, for winning aerobatics championships.

It is the Spinks Akromaster — 'Spinks' for Mr. M. H. "Pappy" Spinks, the wealthy Texan who backed the expensive project; and 'Akromaster' for what it is supposed to be. It isn't a modified Chipmunk, or a variation on some elderly German training plane, or, for that matter, a true homebuilt. The Akromaster was designed by a team of engineers and pilots, and built in a small workshop having all the facilities of a factory. While it isn't a radical departure from convention, it is obviously a different kind of aerobatic machine.

Is it any good? Neil Williams, three-time captain of the British team and one of the favorites for the 1970 title, sees it this way: "Within ten minutes, I realized that this machine could easily outclass a Zlin, and all the Zlin advanced figures were easily carried out. Handling was docile, control forces were light and the response was crisp. The acceleration and takeoff was very high and the rate of climb better than we are used to. The aircraft was light, powerful and strong, and was a sheer delight to fly. It was also one of the most beautiful aircraft I have ever seen." All this praise for an airplane designed expressly to beat him.

No airplane is completely original, and the Akromaster can trace its ancestry back to the Chipmunk and Zlin. The latter has ruled championship competition for many years, and the former is the American attempt to approximate its performance by beefing and souping up the veteran British trainer. Graceful, precise maneuvers and superb vertical capability count highly in international meets, and so the clean, powerful monoplanes have captured favor in many quarters.

To match or exceed the reigning types, Spinks & Co. took the controls of the modified Chipmunk, the clean lines of the Zlin and the versatility of a midwing design and tossed in a potent 200-hp Lycoming AIO-360-A1A fuel-injected engine turning a 74" Hartzell constant-speed prop. The unsurpassed visibility of a full bubble canopy was included, and tinted for pilot comfort.

While the relatively long wings (30 ft.) reduce the snap-rolling qualities, the machine does excellent vertical slow and point rolls, and these are among the highest point maneuvers under the Aresti System. Inverted flight is equal to anything yet seen.

Construction is quite conventional. The wing consists of an I-beam main spar built up from angles, conventional metal ribs and stressed skin. The tail is full cantilever with wires added as extra precaution for tail slides and snap rolls. The fuselage is tubular frame with metal skin back to the rear of the cockpit and fabric to the tail. All riveting is flush. The airplane was designed for easy dismantling and can be taken apart for shipping in just 30 minutes.

Chief pilot for the Akromaster, both in development and competition, is Charlie Hillard, 1967 U. S. National Champion and member of the U. S. Team in 1966 and 1968. He flew it for the first time in September, 1968, and the following month, despite limited practice in the new craft, placed fourth in the Nationals at his (and its) home field of Oak Grove, Tex.

Hillard has flown the Krier Kraft and a Great Lakes as well as the Akromaster in competition, and has some definite ideas on the design of an aerobatic craft, many of which he worked into his latest mount. In Moscow, in 1966, he was one of the very few Westerners to fly the Soviet Yak 18 and found it "real clean" but heavy on the controls. "The secret to a competition aircraft is to make it exceptionally clean and as light as possible. You've gotta cut every corner you can on weight without sacrificing strength. I was very disappointed in the Zlin," he said. "The Akromaster has a third more performance. We wanted a comfortable airplane — real important in competi-

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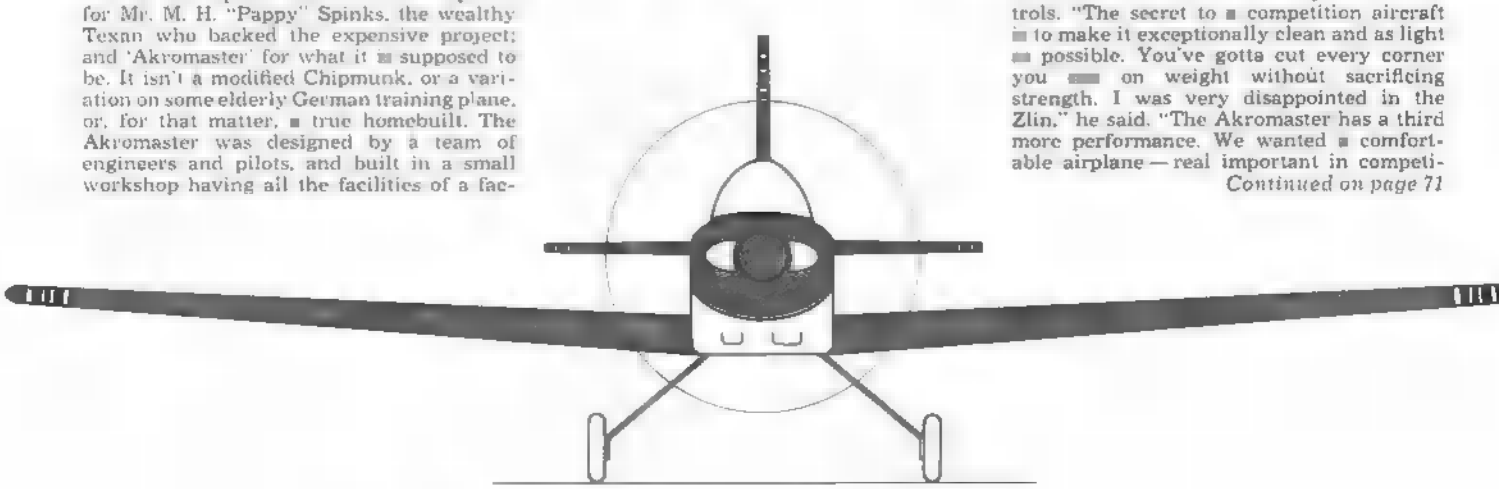

R/C TECHNICAL FEATURE

DR. WALTER GOOD

Computer-designed airfoils

With computer and wind tunnel, Dr. Eppler of Germany developed this series of special sections

Editors note: *Original author of this article is Werner Thies whose text was translated by H. J. Meier and this was re-told and elaborated upon by our author Dr. Walter Good. Acknowledgment is given to "Flug + Modell-Technik" and "Aero Modeller" magazines.*

UNTIL a few years ago expert opinion on the subject of R/C airfoil sections certainly was not uniform. Some of the experts preferred the so-called semi-symmetrical sections — that is, sections with more less pronounced convex bottom curvature. Others believed the NACA-type laminar sections to be superior, while still others stuck to symmetrical sections with thicknesses of up to 20%.

In the meantime, considerable airfoil design work for full-scale planes and gliders has been done with the help of appropriate theory and the new high-speed digital computers. One of the world's leading practitioners of the airfoil design science is Dr. Richard Eppler of Germany. Many of Dr. Eppler's airfoils are used in today's top-performing sailplanes. Fortunately, Dr. Eppler is a former model plane expert and, further, a modeling friend of Werner Thies, the original author of this article. Being scientifically inclined, Thies asked Dr. Eppler design some airfoils satisfy certain conditions which were desired by Thies' model club in Kaltenkirchen, Germany. Here the six requirements which were laid down to Dr. Eppler and his computer:

1) The Reynolds number should range from 250,000 to . Since Reynolds number is proportional to model speed and wing chord, this range implies the desire for good characteristics for a wing chord of one foot flying at speeds of 25 to 45 mph. This places the emphasis landing approaches and slow maneuvers since most clean R/C jobs around 70 mph. But, after all, a slow, docile landing approach is definitely a desired characteristic. Remember, Reynolds numbers up with speed and higher number means "performance."

2) Minimum drag at Ct of 0.2 through 0.4. Here Ct refers to the airfoil Lift Coefficient which is an indicator of the wing lift at a given speed. For example, a glider may

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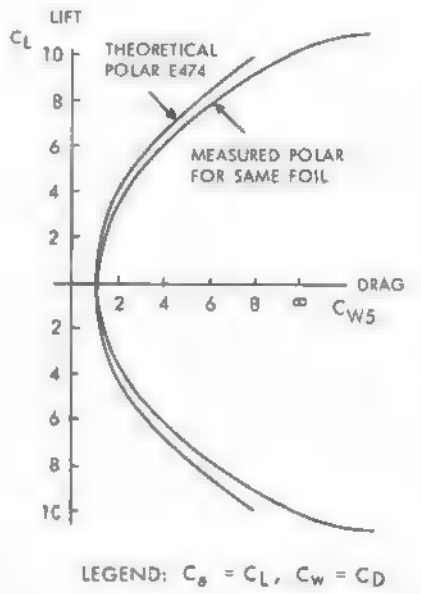
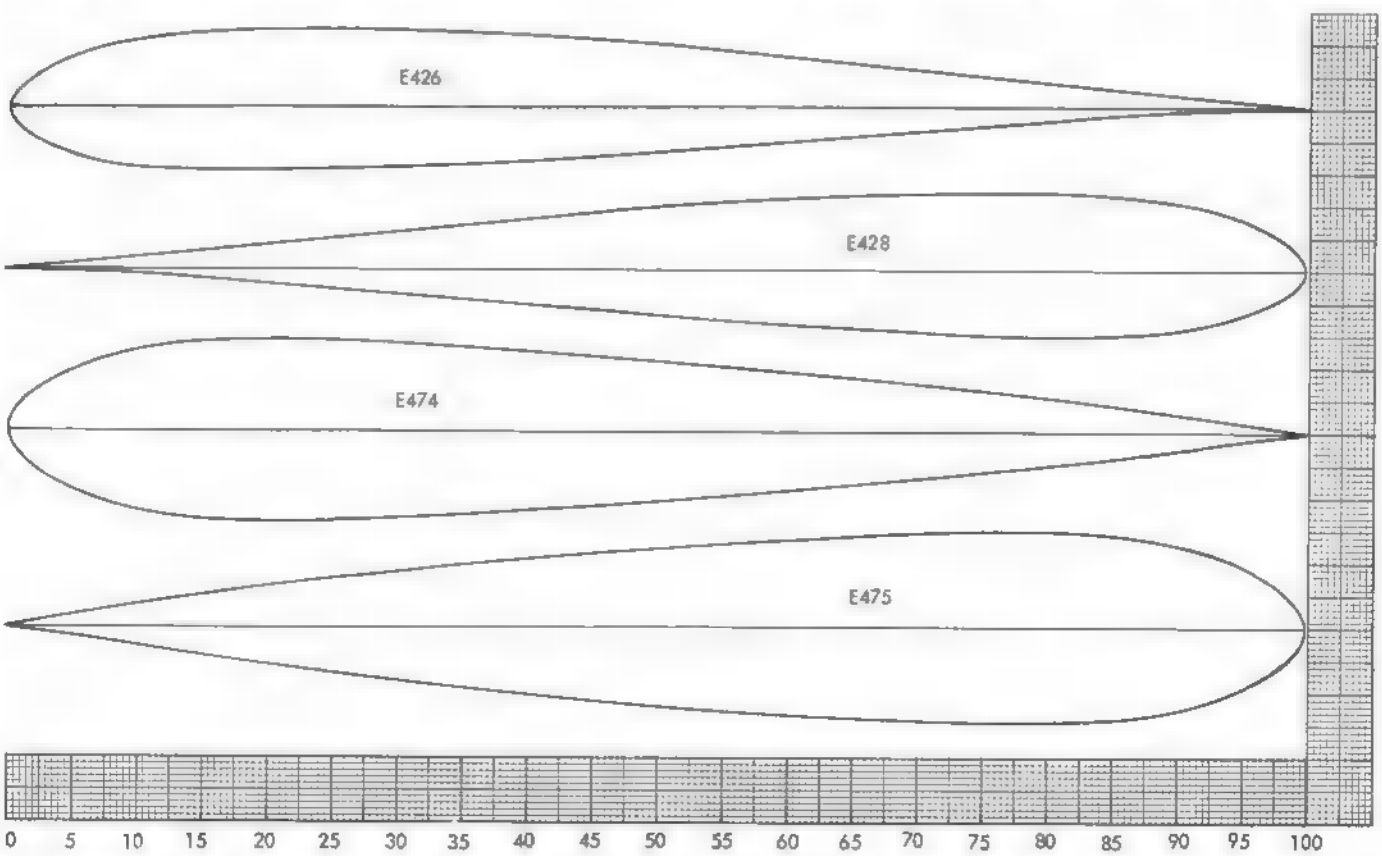
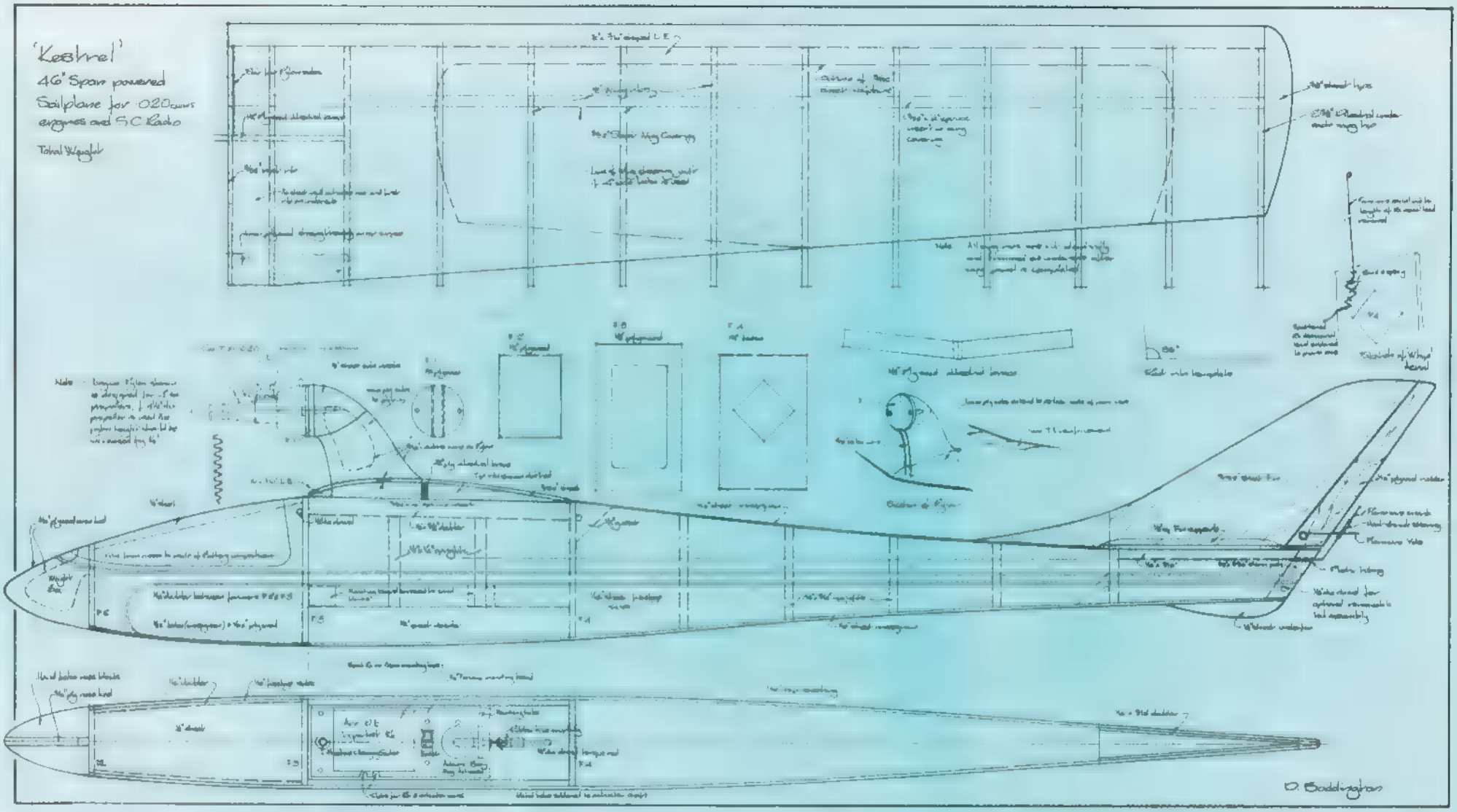


Wind tunnel testing, and R/C models using E474, confirmed performance of computer-designed section. Tested at R. 400,000.



By drawing in the grid lines from the bottom and right side of the diagram you can scale up any of these foils to whatever full size you need. A chord of at least 10 inches is desirable. Note: It is important to preserve trailing edge shape and sharpness.

FULL ■ PLANS AVAILABLE — SEE PAGE 60



Kestrel is an antidote. It settles high-performance-multi nerves with slow, gentle, single-channel gliding. It is great for in-town small-field flying. Photos below show just how simple it is; all-balsa Jedelsky wing, box fuselage, and sheet tail surfaces. Fine R/C trainer too.

estrel

An 020-assisted soaring model for rudder-only, offers relaxing, long flights.

DAVID BODDINGTON

TWITCHING the transmitter levers of a high-speed guided missile demonstrates present-day radio equipment is accurate enough to follow every shake of the hands. It is exhilarating, but it needs an antidote. Kestrel is such an antidote. Flying is slow and easy with only rudder control. This type of model can give hours of fun, and it can be flown from any small flying area.

The Kestrel is the fourth in a line of powered gliders. The design started life as a pure glider for thermal and slope soaring. Unfortunately, the nearest slope soaring site is about 50 miles away and with the vagaries of English weather, often results in an abortive day's would-be flying.

Having given up free-flight flying eight years ago, my attempts to tow the model up on the line proved that my fitness had deteriorated and my legs would do a maximum of 6 mph. But the model required a towing speed of about 8 mph ground speed in still air conditions. By substituting a great length of ¼" flat rubber, it was possible to achieve the same results without expending much energy, or needing a hill. But long grass sliced through rubber like a sharp razor blade. So back to the building board. With a large hill, uncooperative legs, 30 yards of rubber cut to assorted lengths and with a Cox 049 mounted on a pylon and, presto, I was in business.

This original 53" span model was eventually joined by a 36", 010-powered design featuring similar construction to the Kestrel shown here. "Picconiny" proved delightful to fly. It gave an interesting comparison between the sheeted, undercambered wing used, and the conventional built-up, covered wing of the previous design. The sheet wing had a higher lift / weight ratio, allowing a slower flying speed — excellent for calm days and thermaling. For heavier and more bulky radio gear the "Apprentice" was drawn up to cope with 020 to 049 engines, and used a constant-chord conventional wing of 49" span. Although it could be flown in more varied weather conditions, and was tough enough for a slope soarer, it did not possess the power-off characteristics of the Picconiny. The Kestrel resulted.

I am convinced of the desirability of positioning the engine on a pylon over the wing. The high thrust-line helps avoid nosing-up following turns and dives. The high engine position is more efficient than the conventional in-line set-up. It is surprising that this layout has not been employed on more models, particularly beginner's designs, since advantages include the non-sensitive engine side- and down-thrust conditions.

The Kestrel (virtually an enlarged Picconiny) was constructed quickly because I could not wait to try out the latest ACE Pulse Commander outfit. When you consider that the superhet measures only $1^{3}/_{16}$ x $1^{3}/_{4}$ x $^{9}/_{16}$", weighs little more than half an ounce and operates from 2.4 volts, the potential of this double-ended receiver becomes apparent. Add an Adams Baby magnetic actuator and a couple of 225 nickel cadmium button cells and you have a lightweight outfit suitable for small or low-pow-

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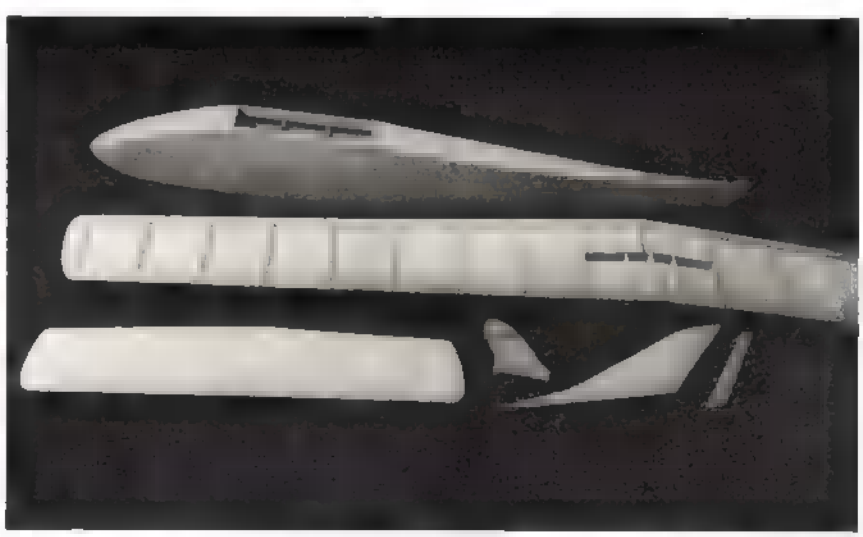

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RAND

and Actuators and now manufactured by Ace R/C at Higginsville, Missouri. The changeover made earlier, production has been moved.

Herb Abrams will continue as the designer and consultant for the Rand manufacturing portion of Ace R/C, this will you of new Rand items quality and leadership in new fields that have come to expect.

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[ ]	1020—Aileron Elevator Horn Bearing,	.75
[ ]	1021—Swing-In Keeper, 4	.60
[ ]	1023—Hinge - 5/32" wide Neutral Axis Hinge,	1.25
[ ]	1024—Hinge - 1/4" wide Neutral Axis Hinge,	1.25
[ ]	1025—Hinge - 1/4" Top Edge Hinge, 6	1.25
[ ]	1026—Hinge - 5/32" wide Double Flange Hinge,	1.25
[ ]	7011—Rand Single-Actuator Mtg. Kit	.75
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R/C MULTITESTER

A Multitester designer for RC. This Mu tester distributed by Graupner for the Eu pean countries and made especially for th in Japan. It was selected over all others Graupner as a top RC meter. This gives an i cation of the quality and preciseness. T identical meter is made for Ace R/C distribution in the United States.

DC milliammeter ranges of 100 and 500 M DC volts 3.5, 7, 14, and 250 volts. Measu resistance in 2000 ohms and 200,000 oh 2,000 ohms per volt.

Handy pocket Measures 3⅝ by 5 by inches. Complete with test leads.

No. 22K5—Ace Multitester.....$13

HEAVY DUTY NICKEL CADMIUM

This unused surplus nickel cadmium wet is ideal for starting or any application wh "oomph" required. It 2 5/8" w by 4 1/2" tall, and is only 3/4" thick. Ra from various sources at from 5 to 7 amp hours, depending drain, this husky u May charged with the Ace H-D Charger the Dual Vari-Charger.

Each cell has been filled with electrol and charged--AND is guaranteed.

No. 38K72—5-7 AH Nickel Cad Wet Cell $3. (Orders under $5.00 add 50c handling)

N/C CONNECTOR-STRAPS

May used to make a multiple batt pack out of the batteries listed above. Conn tor Straps are High Ampere rated and wil hardware and of the above battery that multiples of 2.4, 3.6, 4.8, etc., volts required may be made easily and prof ionally.

No. 38K73—N/C Connector Strap, ea

VOGT THROTTLE RESTRICTORS

These must when you want to tame Cox .010 .020. Simply set to position for desired and you have a tame power pl that is just the ticket for the new mini s and semi-scale planes. sure to order correct for your engine—not interchangea

No. 16K105—Vogt Restrictor for .010.....$2

16K173—Vogt Restrictor for .020.....

The Most Exciting News in RC!

PULSE PROPORTIONAL COMES OF AGE --

The reception of our Commander R/O series could only be called fantastic--from California to New York, from Texas to Michigan, from Colorado to Illinois, from Mexico to Maine, from Oregon to Florida--there are satisfied everywhere. AND the list is growing!

Acceptance is from beginners--BUT a lot of it is coming from the digital pros as well! One of them writes: "I realized how much fun simple R/O flying could be until I bought one for my daughter--now it looks like I'll need another for her!" . . . "No long trips flying fields--just short jaunts to the neighboring areas; and my fuel bills are low" . . . "I am 16 and just completed my 10th successful flight with a Whiz Kid, Commander R/O equipped. Great!!!" . . . .From a California dealer: "One of my customers has sold his "X" brand digital and all his big equipment. He's on R/O fun flying!" From Carl Goldberg: "Just a word to let you know how much I've enjoyed flying your Ace Commander Rudder-Only Stomper in Ranger 42. . ." And so it goes!

A number of clubs are talking about Rudder-Only or SAC (Single Axis Controlled) for next year!

The Commander Packages from Rudder, to Ghost, to Fast Pulse designed around Transmitters engineered by Don Dickerson. Each is designed for its specific function.

The airborne packs of the Commander systems built around the Commander Superhet. Used as a DE unit the R/O packs, it has been redesigned for a 3.6 volt input and Single Ended (SE) output for the Ghost and Fast Pack. Thousands of receivers proven in field.

The Commander Series completely wired, and guaranteed. It will not be available in kit form immediately. Transmitter battery, 9 volt of the M1603 or equivalent, is required.

Recommended chargers for the nickel cadmium battery packs in the airborne units are shown right.

A Commander package can your doorway fun--whether you are a novice wanting get into Control; or old hand wanting change of pace.

Our 1970 catalog lists Combos of our Rudder-Only with Owen Kampen's Whiz Kid and Carl Goldberg's Ranger 42--the proven way to go R/C for $100.00 and

Just for fun--join in the trend with your own "proud bird with the go-go tail!"

R/O CHARGERS

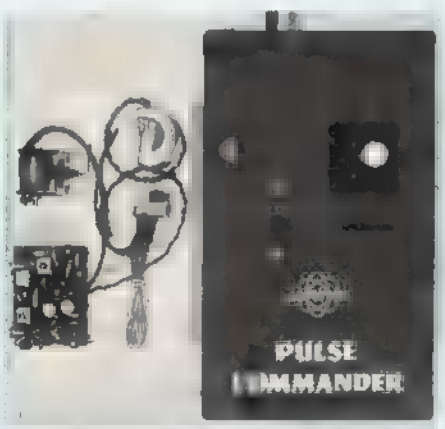
We five transformer isolated chargers which are designed expressly for the Commander R/O units. These are complete with line cord, charging plug and jack, and available in two models. Each charger will give full charge with 14 to hours of charging time. Completely wired tested.

No. 34K4—Commander R/O Baby Charger 4.95
No. 34K5—Commander R/O *S Charger 4.95
*S - Standard Stomper

VARI CHARGER

If you a universal type of charger for your nickel cadmium battery supplies the Vari-Charger has much to recommend it. It features a high quality transformer and will charge up 5 or more cells in series with up to milliamp current. Charging is adjustable from to 150 mils, with easy-to-use chart.

No. 34K21—Ace Vari Charger Assembled 9.95
No. 34K22—Ace Vari Charger Kit 7.95



COMMANDER R/O PULSE PACKS
Ideal for Beginners and Sport Flyers

Rudder-Only has been proven to offer most fun and satisfying experience per dollar invested any of the R/C systems av today. Now, with the new Commander R/O Pack you are assured of the fact that you can start with simple rudder only, and at a later date upgrade your equipment to Galloping Ghost or Fast Rate Decoded systems.

The R/O Packs feature the Dickerson transmitter described above with the Rand single axis stick, and the Commander DE 2.4 volt superhet receiver. Has Adams actuator of the size of your choice, depending upon your aircraft, with nickel cadmium batteries wired with an on and off switch. AND each pack will you $10.00 if you bought the individual items separately.

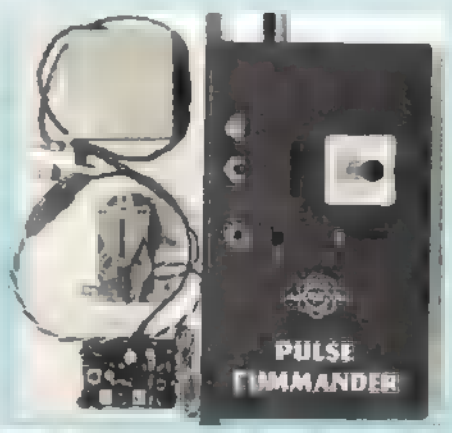
The R/O Baby is for .010 to .020 jobs, has two 225 MA nickel cadmiums, the regular Baby Adams actuator. The airborne weight is 2.5 oz.

The R/O Standard uses the LV single Adams actuator for more power for .049 to .07 size. Uses larger capacity nickel cads. Airborne weight is 4.5 oz.

The R/O Stomper used the LV Twin Adams actuator for up to . or can be boosted for with .19. Airborne weight is 4.9 oz.

(Charging equipment extra)

No. 10G15—Commander R/O Baby $69.95
No. 10G16—Commander R/O Standard 71.95
No. 10G17—Commander R/O Stomper 74.95
All 27 MHZ, except 27.255. Specify.



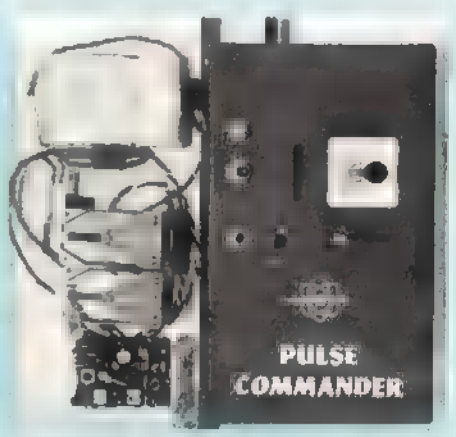
COMMANDER GHOST PULSE PACK
Provides Rudder, Elevator, Motor

Using the basic Dickerson Transmitter but with two axis stick control, the Ghost pulse width and pulse rate and full on-off for control. Receiver Commander SE signed specifically feed into a Rand GG Pack, 3.6 volt nickel cads. This system should used in planes of and up.

(Charging equipment extra)

No. 10G18—Commander Ghost Pack $109.00
27 MHZ, except 27.255. Specify

You can convert your Commander les Rudder Only System (Blue-Grey vinyl case only) to either of the two systems shown above. This you gain experience you can up without obsoleting your original investment.



COMMANDER FAST PULSE PACK
Retains Elevator During Motor Signal

The system here an electronic decoded one which allows a much faster pulse rate and rudder and elevator just quiver. You have FULL control of elevator response motor command--An Ace EXCLUSIVE! Up to .29.

Receiver is Commander SE, Rand Dual Pak, with 1 amp 3.6 V nickel cads.

(Charging equipment extra)

No. 10G19—Fast Pulse Commander $139.00
All 27 MHZ, except 27.255. Specify

No. 10E116—R/O Factory Conversion to Ghost System above $45.00

No. 10E117—R/O Factory Conversion to Fast Pulse System $75.00

NEW HANDBOOK-CATALOG
For the Flyer and

ACE CONTROL • BOX 301 • HIGGINSVILLE, MO. 64037

NEW Handbook-Catalog is bigger and better than specialize in equipment for the Beginner, Sunday and Fun Flyer. More items for the do-it-yourselfer. More products from most major manufacturers, in addition to many Ace exclusives. Greatly enlarged HANDBOOK section. Last year this was called "Bible for R/C". "a MUST!" by R/C editors. Price is just $1.00 POSTPAID. This is completely refundable on your first order! And that order also puts you on our mailing list for our newsletters and R/C Data Service—acclaimed the world over. You can't lose—send your buck on a round trip today. It could be the best dollar you ever spent!

Important: For overseas delivery on catalog or Binder please add 50¢ for additional postage.

NAME _____
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QUANTITY	STOCK #	ITEM		TOTAL

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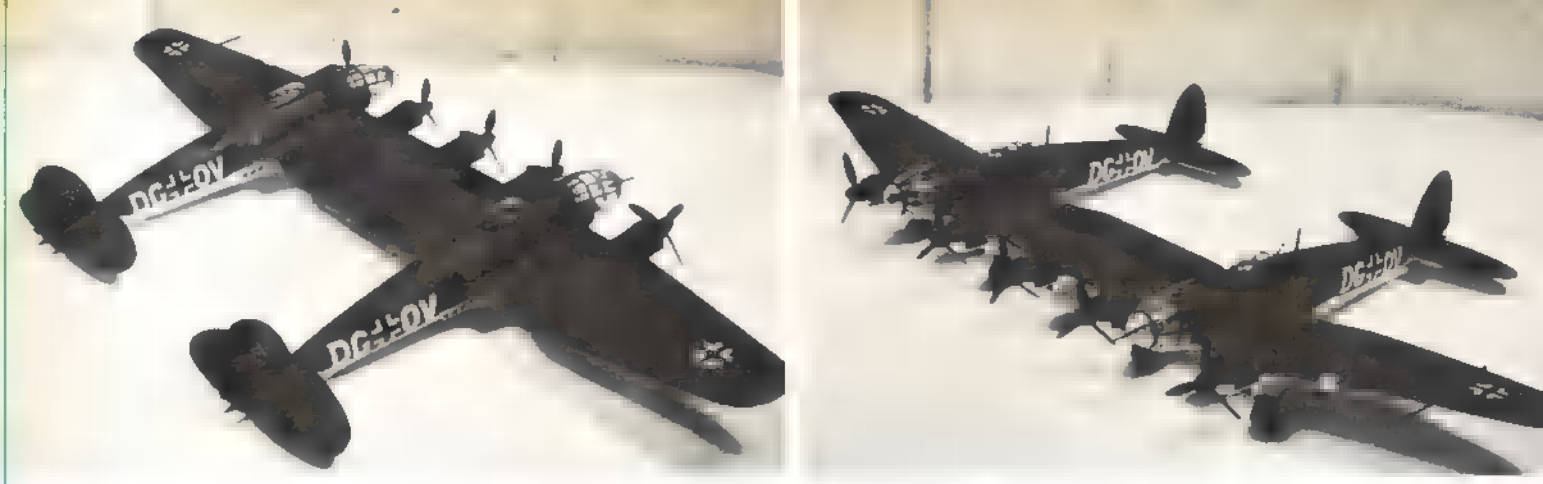


Odd WW-II aircraft make great conversation piece. This one is not too difficult to build and will be the hit of your collection.

SCALE TECHNIQUES FOR THE PLASTIC MODELER

Germany's Siamese Twin

This unusual aircraft was dreamed up as powerful troop-glider tug. It really worked. Model is made from three kits, spans 19½ inches, is 1/72nd scale.

RICHARD MARMO

DURING early 1940, the German juggernaut was still rolling along virtually unchecked through Western Europe. In response to the need for heavy cargo gliders to supply the front, the Messerschmitt Me-321 and Junkers Ju-322 were designed.

With the arrival of these giant gliders, the Germans possessed a problem in search of a solution. The problem, in this case, was where to find an aircraft capable of towing one of the giants into the air. While the Junkers Ju-90 was tried, it proved to be underpowered.

Lacking a specifically designed glider tug, the Germans resorted to the Troika-Schlepp. This triple-tow method used three BF-110C's taking off line-abreast to launch a single glider.

Besides proving dangerous, the Troika-Schlepp concept presented the obvious problem of synchronizing the takeoff of three separate aircraft.

In 1941, the solution was finally born in the mind of Ernst Udet. His idea was to take two standard Heinkel HE-111H-6 twin-engine bombers, and join the left wing of one to the right wing of the other via a new constant-chord center section, mounting a fifth Jumo engine at its centerline. The resulting design was designated the HE-111Z, with the Z standing for Zwilling (Twin).

This is one case of an oddball configuration being completely successful. Flight tests

Both, William Green

Rare photos of real HE-111Z taken about 1943. The five Jumo engines provided tremendous horsepower for towing large troop gliders.

In joining the two kits, a center section must be made of pine carved to fit into adjacent plastic wings. Fifth, or center, engine is installed after assembly.

showed power to be more than sufficient to handle the Me-321 or Ju-322, or alternately, two Go-242's.

The HE-111Z's overall dimensions were: Span — 116', 1⅔"; length — 53', 9⅜"; distance between fuselage centerlines — 41', 11¾"; and wing area — 1587.06 sq. ft.

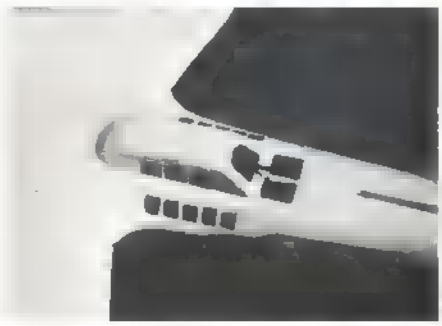
Only 12 examples were built, eight being destroyed during the course of the war through air-to-air fighter attacks and bombing raids on their fields. The four survivors apparently were deliberately destroyed after the surrender.

Because of this comparitive rarity, you have a chance to add a model of [redacted] unusual and little-known aircraft to your 1/72 WW-II collection.

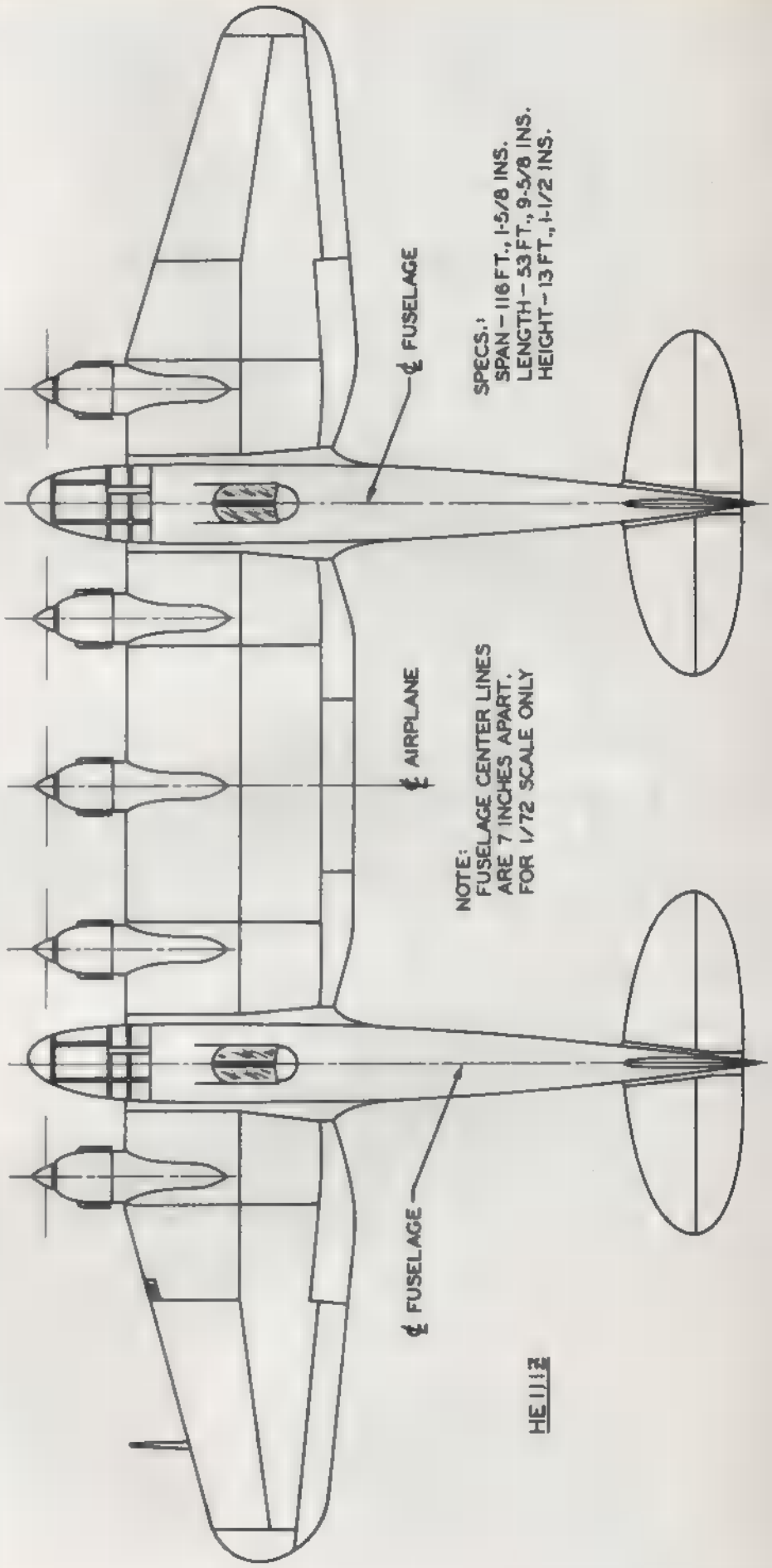
Since the HE-111Z had five Jumo engines, you'll need three kits of the Airfix HE-111H-20 (1/72 scale). The Airfix kits were produced for a time in this country by Craft Master, but they are now becoming hard to find. However, The Squadron Shop, Inc., 23500 John R., Hazel Park, Mich. 48030, stocks the kit.

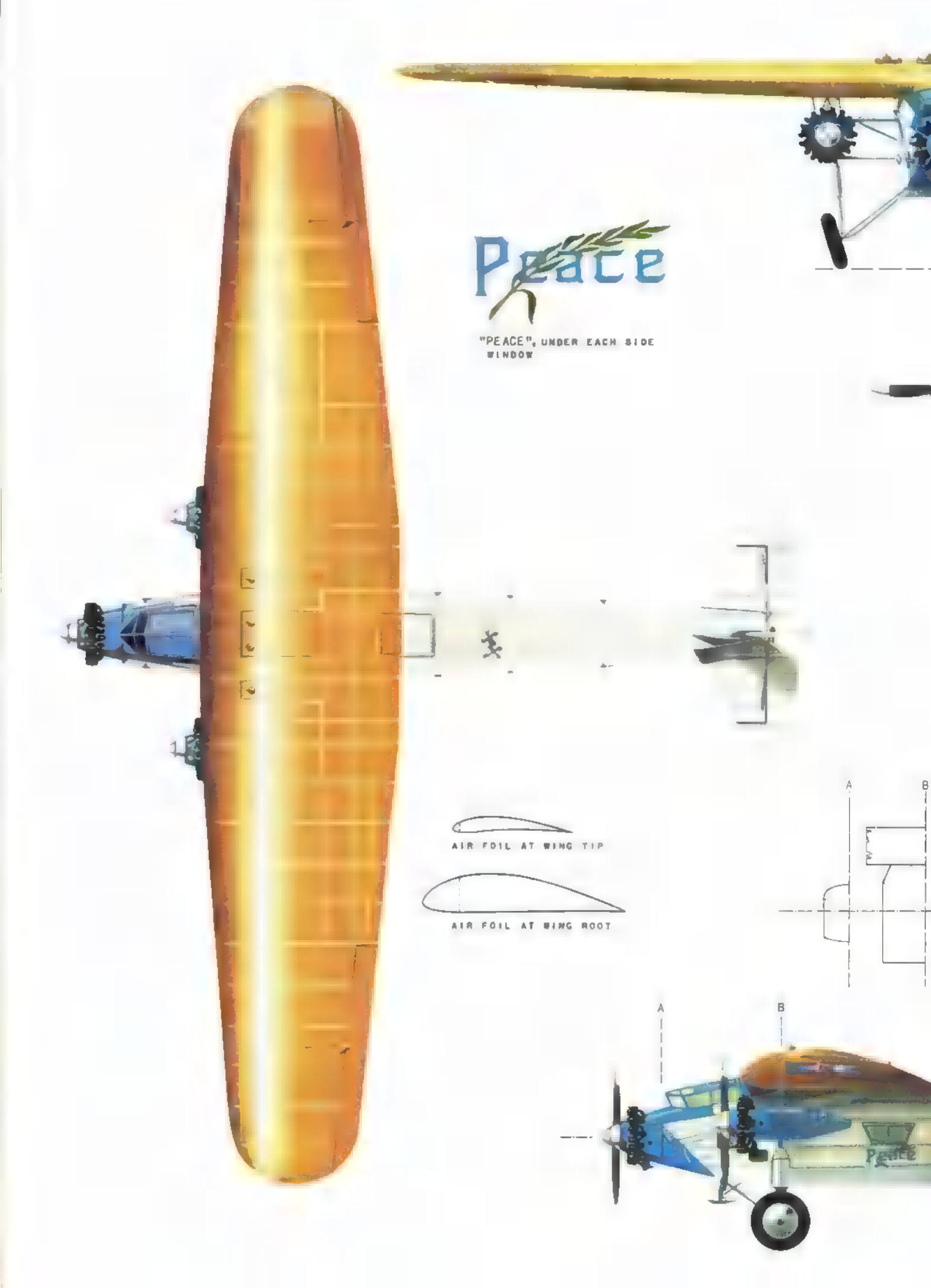
After assembling the cockpits, fuselages and all wings and stabilizers, [redacted] left and one right wing can be chopped [redacted] the second panel line outboard of the nacelle. Be sure to stay at least 1/32" outside of the panel line so that you leave yourself enough room to sand the ends true. Once this is done,

Continued [redacted] page 68



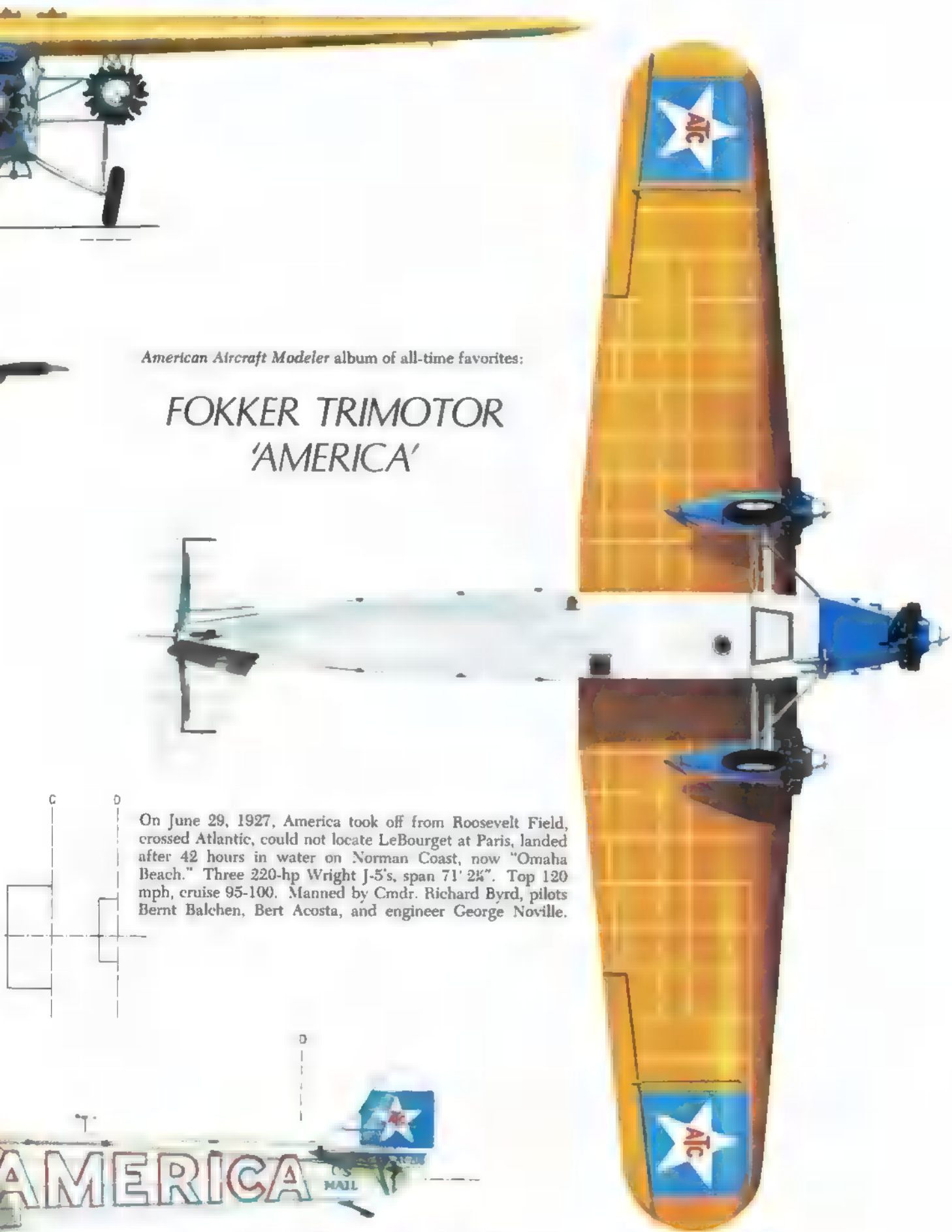
Making the belly-gun turret requires shaping wood or plastic then inserting windows.




Peace
"PEACE", UNDER EACH SIDE WINDOW
AIR FOIL AT WING TIP
AIR FOIL AT WING ROOT
A
B
A
B
Peace

American Aircraft Modeler album of all-time favorites:

FOKKER TRIMOTOR 'AMERICA'

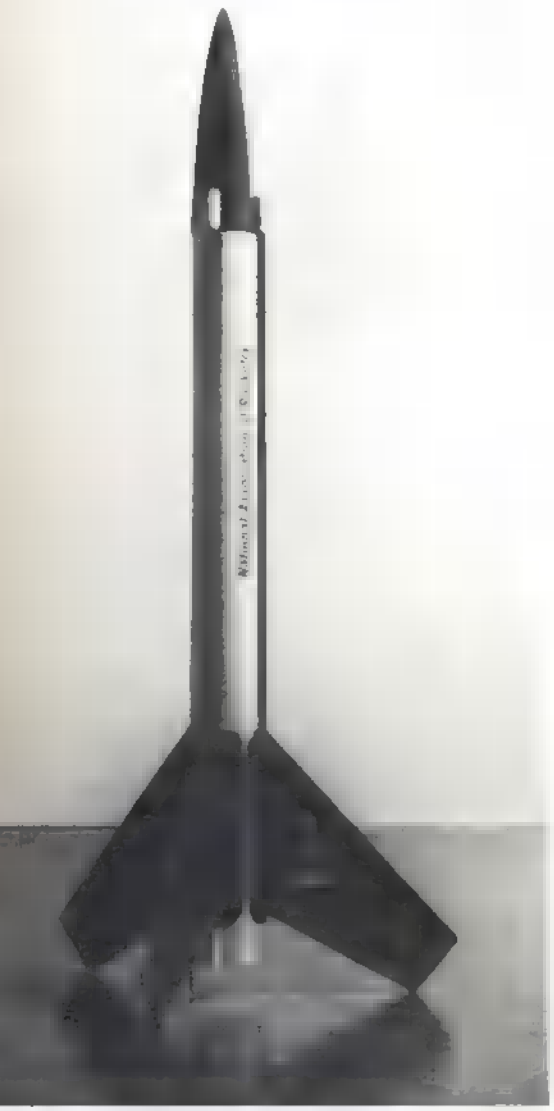


On June 29, 1927, America took off from Roosevelt Field, crossed Atlantic, could not locate LeBourget at Paris, landed after 42 hours in water on Norman Coast, now "Omaha Beach." Three 220-hp Wright J-5's, span 71' 2¾". Top 120 mph, cruise 95-100. Manned by Cmdr. Richard Byrd, pilots Bernt Balchen, Bert Acosta, and engineer George Noville.

Unicon

General purpose, altitude or payload rocket, offers unusual method of safe recovery.

MELVILLE GRANT BOYD / photos and drawings by author



When it gets where it's going, this "upshot" just goes all to pieces! Because of recovery system, it can easily be spin stabilized.

HERE'S the Unicon, a weird beastie indeed! He's missing the letter "R" in his name, you say? No, the missing letter is intentional — it symbolizes the system by which the rocket functions. Uni from unified and con is derived from consolidated, and that's just what the Unicon is because he comes down as one piece. The fins are held in place only as long as the nose cone is in place. Upon firing of the ejection charge, the rocket explodes to disintegrate, all five parts coming down tethered as one unit. The high resulting air friction ensures a safe landing. The beauty of the beast is that he needs no parachute or protective wadding.

All parts are standard materials available from Estes Industries. White glue is used throughout.

Begin assembly by tracing the fin guide onto stiff paper, wrapping it around the main body tube as shown in Fig. 1 and taping it together. Mark the body tube at each arrow point. Now slide the fin guide over the short body tube, this time marking only every other arrow point. All these lines must be extended the full length of each body tube. This may be easily done by using any available straight groove as a guide — such things as door jambs, moldings or angle iron.

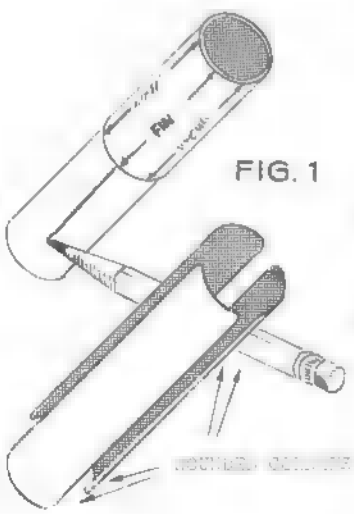
The shorter body tube must be cut into three equal sections, as shown in the lower part of Fig. 1. Cut each corner slightly round.

Cut three dowels exactly the length of the short body tube, 8.65". These dowels are very thin, an aid in weight reduction. You must build up each end as they will fit the launch lugs to be used as stay holders. Cut six strips of paper ¼" wide by several inches long. Smear one side with glue and wrap neatly around each end of the dowels, referring to Fig. 2. Wrap only enough to ensure a loose fit.

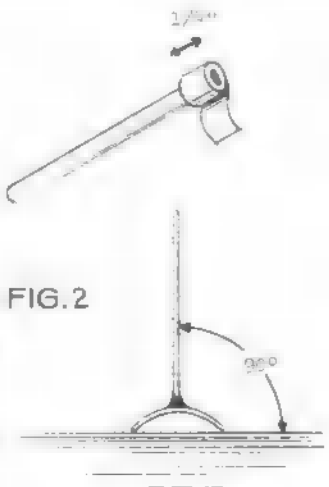
Run a bead of glue along the center of each "stay base" you cut earlier from the short body tube. Put the dowel assemblies (stays) in place as shown in the lower part of Fig. 2. Apply a fillet of glue along each side of the dowels.

Trace the fin pattern onto heavy paper. Using this pattern, cut three fins from 1/16" balsa sheet, ensuring that the grain is parallel to the leading edge. Round all surfaces and edges to a smooth airfoil except for the root edge (the portion that will be glued to the stays). Apply balsa filler and sand lightly with fine sandpaper when dry. This must be done at least four times or until all trace of grain disappears. It may be accomplished between the succeeding construction steps. When the fins are smooth, glue each to its stay assembly, referring to the main plan and the lower part of Fig. 2. Set aside to dry.

Finish the nose cone in a manner similar to the fins. When dry place it on one end of the main body tube. Cut six ½" lengths of launch lug material for the stay holders. Glue three of these on the rear of the body tube, flush with the end, referring to the fin guide and end view on the main plan. Glue the remaining three stay holders in place on the cone in respectively similar positions. Be careful not to glue these to the body tube.

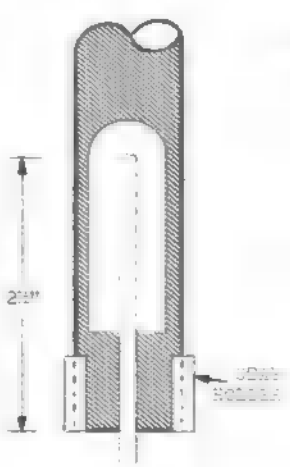


Using a tube which is concentric over main body, divide it into three parts as fin holders.

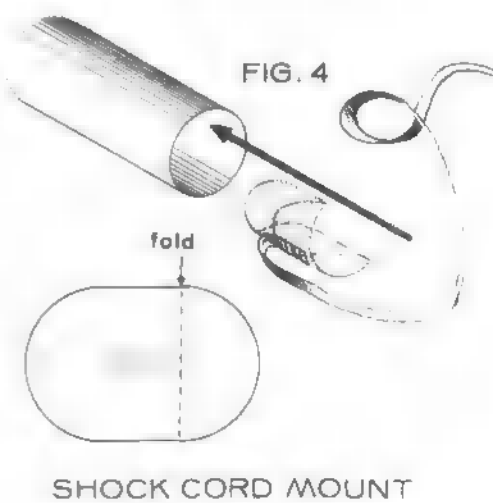


Fins and stays are glued to the body sections. Roll and glue paper to tip of stay to fit top keepers.

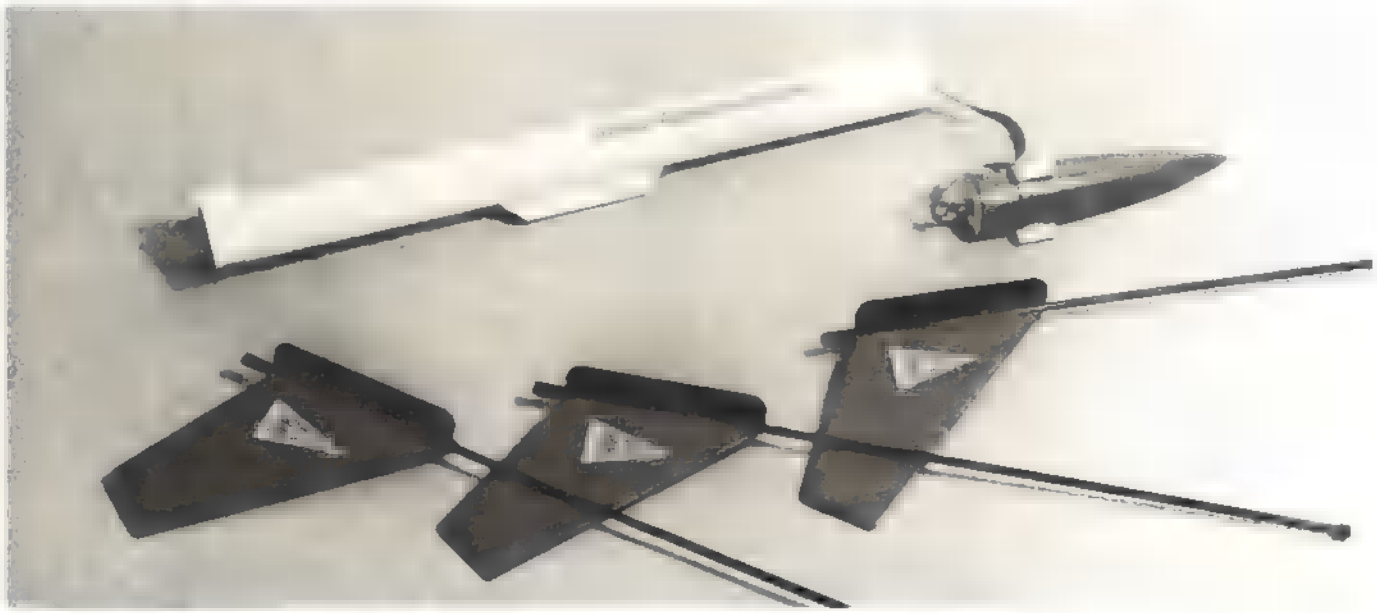
FIG. 3



Launch lug sections make stay holders. Engine keeper is thin wire firmly glued outside body tube.



Position shock-cord mount deep inside body to clear the cone and screw eye.



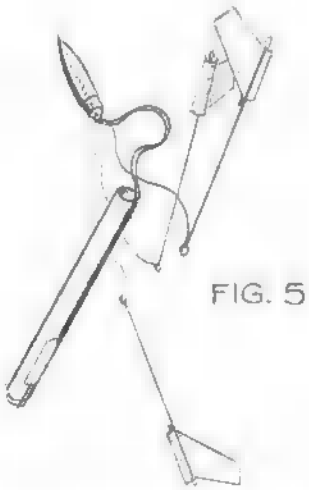
Fin and stay rod units are identical. In use, piece of strong thread keeps all parts together for the fall back to earth.

When these are dry apply small fillets of glue to all sides. Cut six strips of paper 3/16" wide by several inches in length. Roll these with glue to make tiny plugs for the stay holders. Glue them into the top end of the top stay holders and the bottom end of the bottom stay holders. These will prevent the stays from inadvertently falling out during flight.

You are rapidly nearing completion of this rocket. Now you are ready to take care of the miscellaneous details common ■ most model rockets.

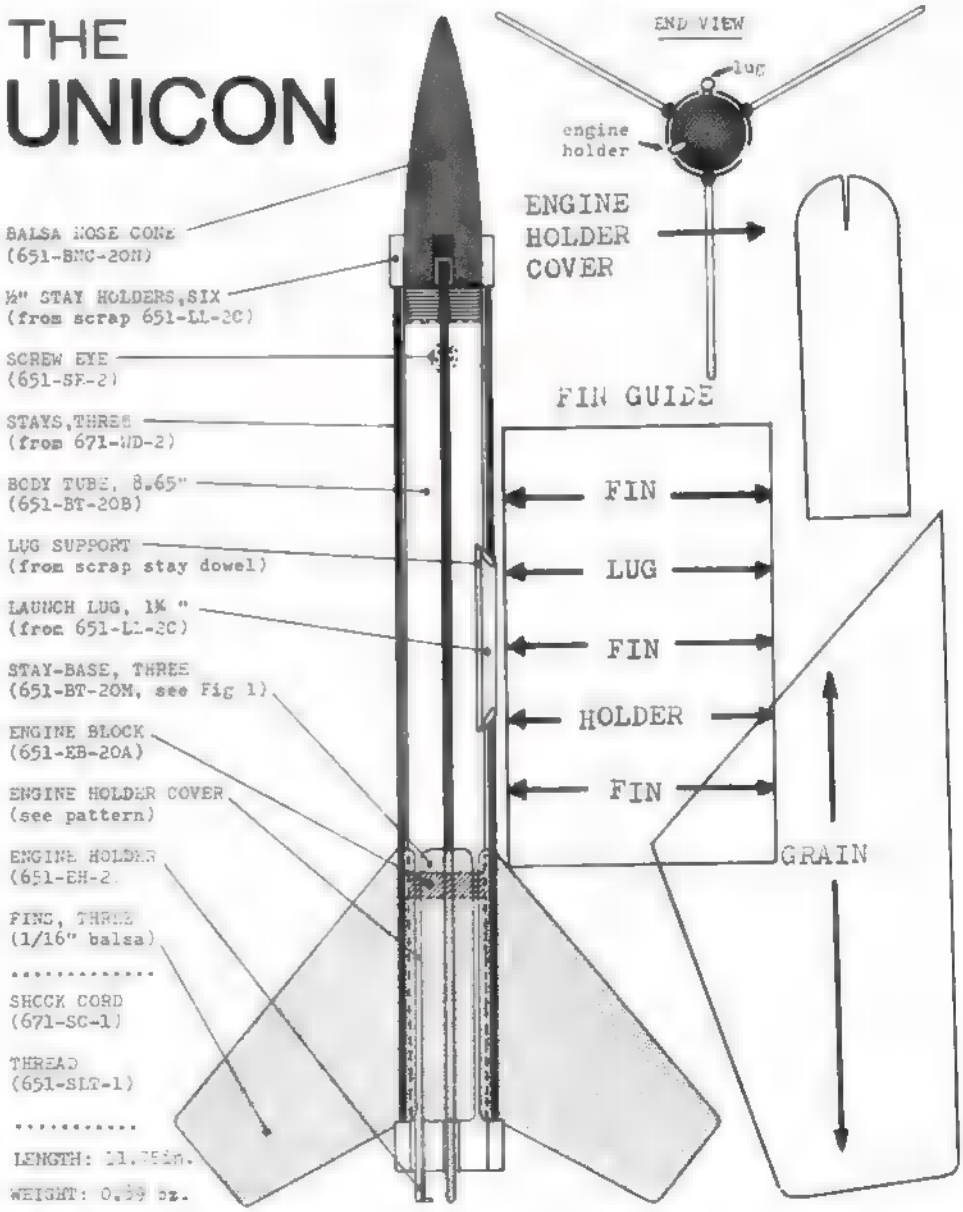
Prepare and glue in place ■ launch lug and support as shown in the main plan and end view. Prepare a parachute. Wait ■ minute, this model rocket doesn't require ■ chute! That's what habit does to you. Prepare only a shock cord and mount ■ shown in the figure entitled "shock cord mount." Glue the mount well down inside the body tube to allow clearance for the nose cone. Glue and screw the screw-eye into the center of the nose cone base. Tie the shock cord onto the eye. Mark the body 2½" from the

Continued on page 66



After thrusting rocket to altitude motor blows nose cone off, which releases stays and fins.

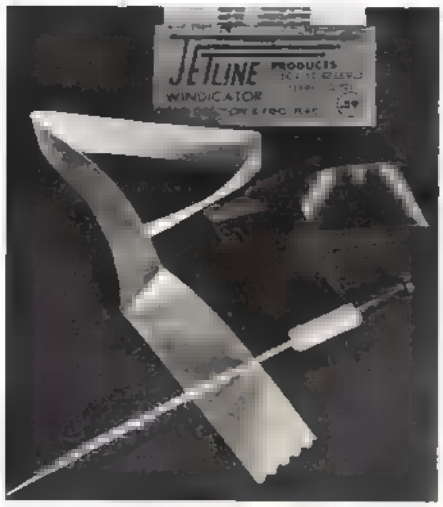
THE UNICON



Body tubes, nose cone, engine, and other parts are available commercially ready-to-use. Fin, engine-holder cover, and fin guide for making stay bases are shown full-size.

NEW PRODUCTS CHECK LIST

Write the manufacturers for more data; tell them, "I saw it in American Aircraft Modeler."



Jetline Products/"Windicator." Wind direction and frequency flags for R/C transmitters come in 15 color combinations for 27, 53, and 72MHz. Ultra-light-weight silk plus special plastic clip allow flags to swing freely in wind for sure directional info. Cost 59 cents. **Jetline Products**, Box 22, Bellevue, Tenn. 37021.

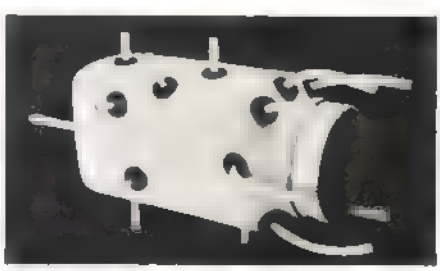
Williams Bros./Spandau Gun. Latest of their line of A/C machine guns. **Spandau** was standard forward-firing gun for most German WWI fighters. Now in 2" scale for $1.25, 1½" and 1" scale coming. Styrene construction, movable cocking lever. **Williams Bros.**, 6719 Salt Lake, Bell, Calif. 90201.

Carl Goldberg Models/Mini-Links. Adjustable, approximately 10" control rods [illegible] tough nylon connecting links for throttle, [illegible] wheel, control surfaces, etc. No electrical noise. Cost, set of four, $1.16. Write **Carl Goldberg Models Inc.**, 2545 W. Cermak Rd., Chicago, Ill. 60608.

Sterling Models Inc./Bluenose. Beautiful detail and many pre-finished parts make this model of Nova Scotia's famed schooner easy to build even for beginners. Machine-carved hardwood hull, tapered masts and spars, scale rigging, pre-grooved deck planking provide realism. Also, U. S. Revenue Cutter Hamilton. Each kit, including mahogany base, $9.95. **Sterling Models Inc.**, Belfield Avenue & Wister St., Philadelphia, Pa. 19144.

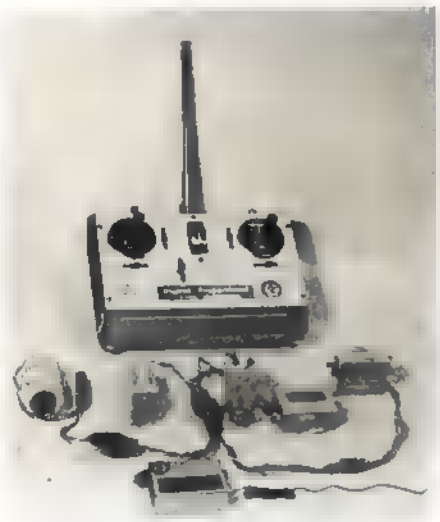
Jetline Products/Control Horn. Is large, heavy-duty for full-house models. **"Positrol"** horns are of sturdy nylon and allow mounting on control surfaces up to ⅜". Cost, with hardware, 79 cents pair. **Jetline Products**, Box 22, Bellevue, Tenn. 37021.

Brown Junior Motors, Inc./Mini CO_2 engine. Tiny piston-powered CO_2 engine operates about [illegible] minute with charge from accessory filler tank. Ideal low-power for small indoor flying models [illegible] as replacement for rubber-powered motor. Engine runs in either direction. Copper and brass fittings on fuel tank allow easy modification for custom fitting with soldering gun. Instant start, quiet running. Price, about $20. **Brown Junior Motors, Inc.**, Box 77, Pine Grove Mills, Pa. [illegible].



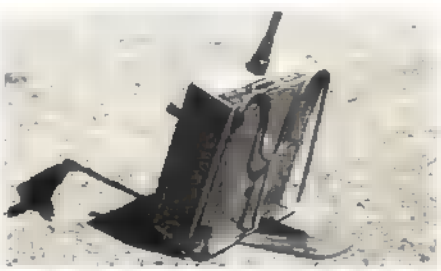
Tatone Products/"Sticka-Tube" tanks. Solving the problem of fuel lines that exit from tank at awkward angle, new method allows placement of line anywhere for convenient, short-line run. Kit contains standard tank, punch, seals, nylon tubing, etc. Also spare parts kit for backfitting your present fuel tank. Tank sizes: 3, 4, 6, 8, 10, 12, 14 ozs.; rectangular or oval. Price, up to 6 ozs., $2.25; over 6 ozs., $2.50. Spare parts kit, $1.29. **Tatone Products**, 4719 Mission St., San Francisco, Calif. 94112.

EK Products Inc./Control Hinges. 18 per package, hinges provide tough, flexible action in hot or cold weather. Special barbs on plastic hinge face provide tooth for strong interlock with epoxy. Recommended three hinges per control surface. Price $1.50 per pack. **EK Products Inc.**, 3233 W. Euless Blvd., Hurst, Texas 76053.



MRC/Five-channel digital-proportional set. Made in Japan from U.S. design, set is complete with four dual-linear servos, four-cell battery pack and miniature receiver. Special grounding provides [illegible] rejection and sensitivity. Angled antenna gives good radiation pattern.

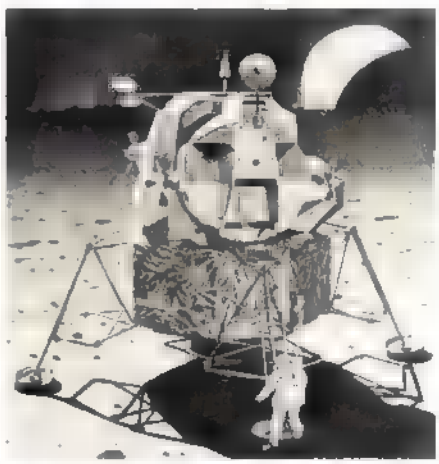
Airborne units are light-weight, suitable for use in smaller aircraft. Built-in charger for transmitter and airborne NiCads. Available on any 27-MHz channel with throttle, left or right operation. All controls trimmable. Construction fully to U.S. standards. **Model Rectifier Corporation**, 2500 Woodbridge Ave., Edison, N.J. 08817.



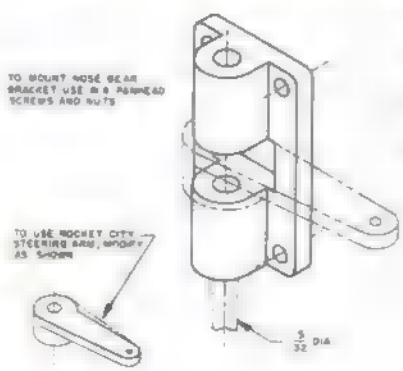
Harco Corp./Transmitter Minder. Protects transmitter and keeps it upright in field. Does not attach permanently and folds flat when not in use. Fits all popular makes. **Harco Corp.**, 290 Thompson St., Oceanside, L.I., N.Y.

Ra/Car/19-powered racers. For ROAR-sanctioned competition, kits provide simple construction with quality components — suspension, transmissions, centrifugal clutches, wheels, tires, etc. Shown, formula car with in-line engine and two-speed transmission. Also less expensive sidewinder with single-speed belt drive system. Write **Ra/Car Developments**, 307 N. Euclid, Fullerton, Calif. 92632.

GraMer Plastics/Fournier sailplane. With closed-bead styrofoam construction, 10' model can be finished with epoxy paints or silk with water-based glues. Flown with only a 15 engine, total weight approximately 4½ lbs. with REM control. Kit is noteworthy for good quality material throughout. Plywood is top-grade as is other hardware. Building time about one day. Price $39. Write **GraMer Plastics**, 4261/2 N. Jackson St., Jackson, Mich. 49201.



Revell/Eagle Module. Detailed model of LEM used by Armstrong and Aldrin on first lunar exploration. Clear windows, detailed thrusters etc. Price $2. Also three other space-oriented kits — the **Columbia** with **Eagle Apollo** and **Gemini**, and **Mercury**. **Revell Inc.**, 4223 Glencoe Ave., Venice, Calif. 90291.



Rocket City R/C Specialties/Nose Gear Bracket. New steerable nose-wheel mount, only 7/8" wide for easy mounting between motor mounts. Can be used with Rocket City or other similar steering arm. Write **Rocket City R/C Specialties**, 1901 Polk Drive N.E., Huntsville, Ala. 35801.

Revell/20 new scale kits. Giant promotion contest program is scheduled along with introduction of new line of scale aircraft and customized cars. Prizes for builders and dealers. Four kits are "2-in-1" concept with famous adversary fighter planes (**Spitfire/ME-262** etc). Nationwide promotion campaign scheduled. Write **Revell Inc.**, 4223 Glencoe Ave., Venice, Calif. 90291.

COX ENGINES AT THE 1969 NATS*

EVENT	CLASS	FIRST	SECOND	THIRD	FOURTH	FIFTH
1/2A Speed	Junior Senior Open	Cox .049 Cox	Cox .049 Cox	Cox .049 Cox	Cox .049 Cox	Cox .049 Cox
1/2A Proto	Junior Senior Open	Cox Cox Cox	Cox Cox TD Cox	Cox Cox TD Cox	Cox Cox	Cox Cox
1/2A Proto Profile	Junior	Cox	Cox TD	Cox	Cox	Cox
Navy Carrier II	Junior		Cox			
1/2A Gas	Junior Senior Open	Cox Cox	Cox Cox Cox	Cox Cox Cox	Cox Cox TD Cox	Cox Cox Cox
A Gas	Junior Senior Open	Cox Cox	 Cox Cox TD	Cox	Cox Cox Cox	 Cox Cox
FAI Power	Junior Senior	 Cox		Cox		
Helicopter	Open		Cox			
Flying Scale	Junior Senior Open	Cox Cox			Cox Cox	Cox

L. M. COX MANUFACTURING CO., INC. / COX CENTER, SANTA ANA, CALIFORNIA 92702

*OFFICIAL AMA RESULTS

FEBRUARY 1970

MODEL AVIATION

Official magazine

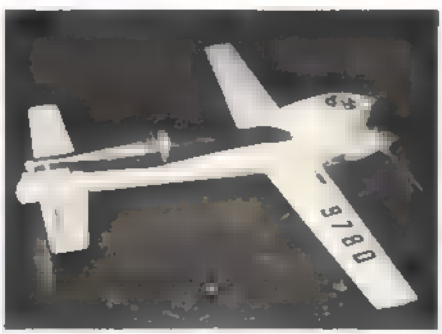
A.M.A. NEWS

Academy of Model Aeronautics • 1239 Vermont Avenue, N.W. Washington, DC 20005

Reviews of National AMA Record Holders

CL C Speed national AMA record, Open age class: 197.60 mph, established by the team of Jerry Roselle and John W. Frye, Jr., Dayton, Ohio, on September 14, 1969.

A report of selected recent record holders highlighting the designs and equipment used.



Both the model and the engine used to set this record were the designs of the Roselle-Frye team, apparently the same this used to establish the 1968 C Speed record of 198.60 mph when the minimum size requirement of control lines smaller than present. A three-view drawing of the model appeared in the March 1969 *American Aircraft Modeler*, page 52. The model's wing has 24" span, 3¼" center chord, and its airfoil varies from a lifting center section to symmetrical tips.

The home-built engine has a bore of .969" and stroke of .872". It is equipped with an original tuned exhaust pipe, an original centrifugal fuel switch to actuate a secondary fuel jet in the venturi, Fire Ball cool glow plug and pen bladder fuel tank for their own 50% nitro fuel.

Named Exciter, the model weighed 42 ounces. It was controlled by rebuilt Stanzel single line model and handle units. Du-Bro nylon elevator hinges were used, and the model was finished with SPL-990. Prop for the record flight was a Stegens 9½"D x 12"P.

A note from Jerry Roselle indicates the team had a flight going of 202 mph, but the fuel out on the last lap — waited too long to call it, he says.

FF A Gas national AMA record, Open age class: 94 minutes, 19 seconds, established by Lee Polansky, Pasadena, Calif., on May 4, 1969.

Model was the Wizard 350 designed by Ron St. Jean and Polansky, having a wingspan of 57", 7" major chord, tapered wing tips. Stab, also tapered planform, has 28" span, 6" center chord. Overall length of the profile-type fuselage with side mounted Cox TD .051 is 44". The pylon model had 10° down engine thrust, 1° right. Wing and stab airfoils are both flat bottom, 9% thickness

Continued on page 48

This Is Last Issue for 1969 AMA Members

Only those who renew memberships time will receive continuing of *American Aircraft Modeler* without interruption. Furthermore, those 1969 AMA members who haven't paid 1970 dues by December 15 will get the next issue late — probably not until mid-February — assuming that they renew membership by January 15. And if later than that they won't get the next issue at all. It's simply the mechanics of magazine ordering and mailing.

The March issue is mailed in early January, but it's December when copies have be ordered and the first mailing tape of addresses made up. A second mailing tape made in late January to get magazines to those who joined between Dec. 15 and Jan. 15 — provided HQ guessed right estimating how many copies to order for late-comers. After Jan. 15 there's no choice but to forget about the March issue and move to April.

This is why it's necessary to get membership processing initiated as soon as possible — it's too costly and complicated to do anything else. If you haven't signed up for 1969 AMA membership yet, do it now in order to get the most for your dues money.

Design Competition to Help Beginner Program

The Executive Committee of the National Free Flight Society and the Academy of Model Aeronautics jointly announce the beginning of the NFFS Design Competition, a program to develop a series of simple free flight rubber-powered model designs that will inspire neophyte modelers to further explore every phase of our modeling hobby.

The Design Competition will provide a series of models that are logical steps beyond the highly successful AMA Delta Dart (AMA Cub) program. **There are just three rules:** the designs must be rubber-powered; they must use "store-bought" plastic props; the maximum wingspan is 24". Any construction method allowed, keeping in mind the requirements of simplicity and interesting performance.

Each entry must include the designer's name, address, AMA number, the building time, the flight duration of the model, the prop used, a full-sized plan (pencil sketches will do) and $1.00 entry fee. At least one photo of the completed model is desired, although not required. Entries become the property of the NFFS.

Each model will be judged for features in three categories: "flyability," according to average flight duration; ease of building and trimming for a beginner; and originality and visual appeal. Winning designs will be decided by the total point score assigned to the model by the above criteria. The competition ends April 1, 1970.

The nine winning designs will receive handsome wall plaques for their achievement. All winning designs will be flown at 1970 Nats in demonstration to modelers, magazine publishers and kit manufacturers.

This competition provides an ideal activity for a modeling father whose son is just starting out, for clubs as an idea for informal club contests, or just for the competitor who needs change of pace from pesky radio interference, sixty-foot lines, or out-of-sight flights.

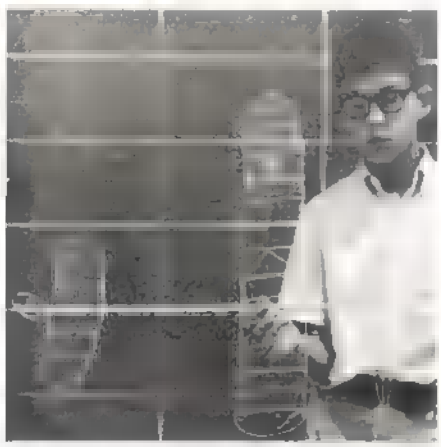
For the NFFS Design Competition entry form, send a note to Annie Gieskieng, 1333 South Franklin St., Denver, Colo. 80210. You'll have a ball with the little gumband wonders, and so will the future champions who get a start with your design.

Continued from page 47

for the wing, 8% for the stab. Wing and stab ribs are of cap strip construction.

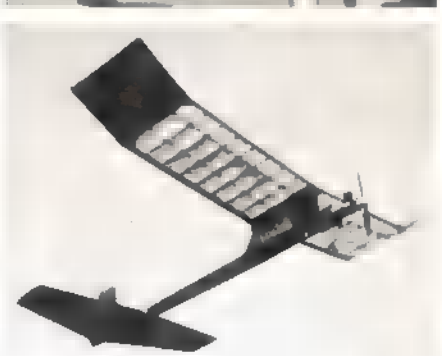
The model was built from Sig balsa, covered with Esaki Jap tissue and finished with Aero Gloss clear dope. The model weighed 8½ ounces. Polansky indicates the engine was modified by balancing the crankshaft. A "Du-Bro" pen bladder tank was used for the K & B Speed fuel, Tatone pinch-off timer. Prop was Cox 6"D x 3"P glass-filled.

Indoor HL Stick and FAI Stick national AMA records, ceiling category I, Junior age class: 15 minutes, 20 seconds, established by Robert Dunham II, Tulsa, Okla., on June 21, 1969.



This model was designed by R. J. Dunham, Robert's father. The design was described in the October 1969 *AAM*, page 44, but for this flight the model was powered by a 15" loop of Pirelli .04" x .055".

FF ½A Gas national AMA record, Senior age class: 35 minutes, 25 seconds, established by Bill Kelley, Torrance, Calif., on August 17, 1969.



Kelley's model was a Sundancer 330 kit produced by 4 K's Models. It has a 45½" wingspan, 7 3/16" chord, and stab span of 24¾", 7⅛" center chord, hollow wing and stab ribs. Ambroid glue was used in construction — model was covered with Jap tissue and finished with Aero Gloss and Kelley's aniline dye.

The Competition Models Tank Mount was used for the Cox TD .049 which swung a Cox 6"D x 3"P prop. A Tatone cut-off was used for engine timing. Sig fuse for dethermalizing. Fox Missile Mist fuel. The model weighed 6½

CL Navy Carrier Class II national AMA record, Open age class: 608.30 points, established by Ray Willman, Normandy, Mo., on August 3, 1969.

Willman set this record with his own adaptation of the Grumman Guardian XTB 3F2S of 36" wingspan, 7¼" major chord, 40 weight. Model was built from Sig balsa and finished with epoxy.

The Rossi used for power was reworked by West Side Hobby. It used a Fire Ball cool glow plug, 10"D x 8"P Rev Up prop, and run on West Side Hobby Brand X fuel. Control was provided by the Roberts 3-line system.

With a similar but smaller Guardian, Willman also set a new Open Navy Carrier Class I national AMA record on the same date. The Class I model of 32" wingspan, 6" major chord, was powered by a K & B .40, also reworked by West Side Hobby, swinging a Rev Up prop of 9" diameter, 7½" pitch. The Class I model weighed

Indoor HL Stick and FAI Stick national AMA records, ceiling category II, Open age class: 33 minutes, 20.5 seconds, established by James W. Richmond, Bensenville, Ill., on April 12, 1969.

This is Indoor World Champion Jim Richmond's design model of 25½" projected wingspan, 5½" chord, powered by a loop of .041" x .048" Pirelli driving an original progressive flare design prop of 16½" diameter, 36" pitch. Wing and stab airfoil is 5% circular arc — wing is mounted 1" off center 3⅛" high wing posts, and the stab is tilted for turn. C.G. is 80% of the wing. Motor stick is of 14½" length, wire braced, and the boom length to the stab T.E. is 12".

The model was constructed from Micro-Dyne and Sig balsa, Micro-Dyne A cement, Micro-Dyne B and Micro-X Red Label microfilm, Micro-Dyne teflon thrust washers, and bracing with .001" nichrome and .0007" Karma wire. It weighed .0191 without rubber. The prop bearing, made from .012" music wire, provided two races for the prop shaft.

On the record flight the model miraculously flew through girder openings twice, bumped into hanging lights and girders a number of times, and came down with a 2" hole torn in the left wing covering.

CL ½A Proto Speed national AMA record, Junior age class: 73.04 mph, established by Elizabeth G. M. Nixon, Wayne, N. J., May 4,

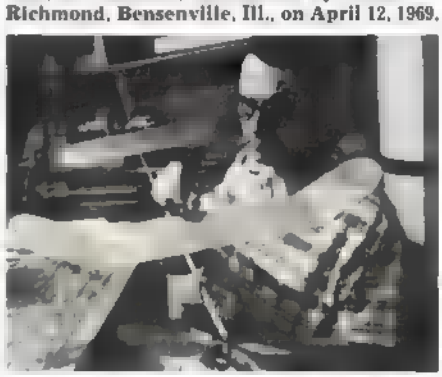
Miss Nixon's model was designed by Henry Nixon, Jr. It was powered by a Cox TD .049, Cox 5½"D x 4"P plastic prop.

The model is of sidewinder design with 18" span wing and center chord of 3⅛" tapering to 2⅛" at tips. Stab is 10" span by 2½" center chord. A small rudder was employed. Control was provided by an original single line torsion bar unit in the model in conjunction with a Stanzel handle.

Among the equipment used in establishing the record were ½" Perfect wheels, K & B Speed fuel, Cox pan, Ambroid glue, Hobby Poxy cement, Aero Gloss dope.

This model also established a Junior ½A Speed national AMA record of 83.56 mph for Miss Nixon on the same date.

Indoor Paper Stick national AMA record, ceiling category II, Open age class: 21 minutes, 55.6 seconds, established by James W. Richmond, Bensenville, Ill., on April 12, 1969.



The specifications of this model designed by World Champion Jim Richmond are quite similar to those of his mike-covered model described above. However, the wing chord is reduced to 5", and the stab is reduced to 13" x 3⅛". Also, the rudder is smaller (1¾" x 2½"), and it is mounted aft of the stab instead of ahead as it was on the mike model. Power for the Micro-X condenser paper-covered model was provided by a 16" loop of Pirelli .041" x .054". According to Richmond, this model is a direct descendant of his FAI designs.

CL B Speed national AMA record, Senior age class: 162.10 mph, established by J. E. Albritton, Falls Church, Va., on July 17, 1969.

An unusual feature of this model designed by Don Jehlik is the long helmet cowl, approximately half the overall fuselage length, described by Albritton as an "aerodynamic cowl." Wing has a span of 18", 3" chord.

The model was powered by a Super Tigre 29 ABC engine fitted with an H & R trumpet head and Fireball blue seal glow plug. The prop for the record flight was a Top Flite 7"D x 10"P. Fuel was a formulation by Al McCarthy as was the original pen bladder tank. The model, 21 ounces, was finished with polyester resin and HobbyPoxy.

Save This List:

1969 Chartered Clubs of the Academy of Model Aeronautics

IF YOU ARE SEEKING

- FLYING FIELD LOCATIONS
- HELP ON MODEL PROJECTS
- LOCAL MODELING LEADERS
- ANSWERS TO TECHNICAL QUESTIONS ABOUT MODELS

Use the following list of 1969 AMA Chartered Clubs as a basic source for the answers to your modeling questions. Contact the person listed for the club nearest you for meeting times and places.

Over 460 clubs are listed. They have a total of over 10,000 members of the Academy of Model Aeronautics.

(If your club is not listed, send to AMA HQ for free Club Charter information.)

ALABAMA

Birmingham RC Assn, F. N. Debardeleben
116 Lake Drive Crestline, Birmingham
Decatur Model Airplane Club, E. J. Minter
2317 Calumet Ave. SE, Decatur 35601
Gulf Coast RC Club, George W. Dowell
3160 Genevieve Court, Mobile 36606
Montgomery Ringmasters MAC, Ed Mycroft
3408 Princess Ann St. Montgomery

ARIZONA

Arizona RC Soc. Inc., Daniel O. Myers
4122 W. Marshall, Phoenix 85019
Air-Zona MAC, Nick S. Lemak
3810 W. Golden Lane, Phoenix 85021
Cholla Choppers MAC, Arliss A. Powell
1935 Calle Pacifica, Tucson 85705
Tucson RC Club, Robert C. Angus
6640 N. Columbus, Tucson 80718

ARKANSAS

Pine Bluff RC MAC, Norman H. Ross
1909 Edmar Drive, Pine Bluff 71601
Fayetteville Aeromodelers
Box 419, Fayetteville 72701
Mid Arkansas RC Soc., R. J. Richardson
11 Glendale Drive, Little Rock 72204

CALIFORNIA

American Model Airport Assoc, Art Hern
12168 Cottonwood, Chino 91710
Antelope Valley Tailwinds, Ed Friend
43805 N. Lively, Lancaster 93534
Birds, Inc., Craft Service
3966½ Studebaker Road, Long Beach
Califas, Douglas H. King
1392 Muirfield Rd. Riverside 92506
Capitol Condors, Inc., Robert M. Fallon
2667 61st St., Sacramento 95817
Central Valley RC Club, J. W. Fitzgerald
1826 Corothea Ave., Visalia 93277
Conejo Valley MAC, Jim Fahnestock
309 Dryden St., Thousand Oaks 91360
Cordova Model Masters Herschel Roby
2648 Palo Vista Way, Rancho Cordova
Diablo Valley RC'ers, D. E. Antkowiak
1597 Laverne Way, Concord 94521
First All Speed Team, T. G. Williams
6308 Plaska Ave., Huntington Park
Fresno Gas Model Club, Ocie Randall
716 Waterman Ave., Fresno 93706
Fresno Radio Modelers, Inc., J. Faas
4713 E. Tyler, Fresno 93702
Kings County RC'ers, C. R. Williams
301 N. Douty, Hanford 93230
Marin RC Group, Howard Baldwin
15 Edward Court, San Rafael [redacted]
MARKS
214 S Riverside Ave., Rialto, 92376
Mendocino Cty. RC Modelers, G. L. Trapp
RT I Box 98 N, Willits 95490
Milpitas E. Soaring Soc., S. Christensen
545 Shawnee Lane, San Jose 32466
Mission Bay Prop Twisters, Wm. Edwards
4470 Brighton Ave., San Diego 92107
Monterey Peninsula RC, Harold C. Weston
Box 326, Carmel 93921
NAA Flightmasters, Fernando Ramos
19361 S. Mesa Drive, Villa Park
Oakland Cloud Dusters, Earl A. Thompson
264 Martin Ave., Livermore 94550
Orange County Thunderbugs, J. Demers
16330 Jody Circle, Westminster 92683
Orangevale Prop Busters, J. Mahoney, Jr.
[redacted] Skyridge Dr., Orangevale 95662
Palo Alto Airmasters, S. A. Conradson
4337 Miranda Ave., Palo Alto 94306
Palomar RC Flyers, Rex Raymond
2108 Montemar Ave., Escondido 92025
Peninsula Chan. Cmdrs, Inc., C. Zimmerman
3229 Bay Road, Redwood City 94061
Pioneer RC Club, Don McCullough
1922 Heatherdale, San Jose 95126
Radio Control Bee's, Bill Boone
517 Middlefield Drive, Aptos 95003
Redding RC Club, Inc., J. E. Warren
755 State Street, Redding 96001
Redding Wire Flyers, Ted Temer
1039 A Cypress Ave., Redding 96001
Redwood Modelers, Richard Lemme
5820 Yerba Buena Rd., Santa Rosa
Sacramento Aero Aces, Ted Werner
10549 Malvasia Way, Rancho Cordova
Sacramento Red Barons, John Sorenson
3610 Annabelle Ave., Roseville 95678
San Fernando Valley RC Club, R. F. Owens
1515 ¾ Pontius Ave., W. Los Angeles
S. F. Vultures MAC, Roger Jacobsen
1730 Terrace Dr., Millbrae 50328
San Jose Wavemaster RC Club,
1298 Antwerp Lane, San Jose 95118
San Gab. Val. RC League, R. Artunian Sr.
1401 Meridian Ave., S. Pasadena 91030
Santa Barbara RC Modelers, J. W. Converse
[redacted] E. Pedregosa, Santa Barbara 93101
South Bay Piston Poppers, T. Prather
1660 Ravenna Ave., Wilmington 90744
S. M. Valley Flyers Mod Assn., [redacted]. Severson
761 Fairmont Ave., Santa Maria 93454
San Valeers, George A. Bahrman
10427 Cumpston St., North Hollywood
Mimi Valley Flyers
2517 E. Phyllis St., Simi 93065
Sky Hoppers of Orange Cty., P. Lambert
10081 Dewey Dr., Garden Grove [redacted]
S. Alameda Co. RC'ers, Inc., R. [redacted]. Franco
[redacted] Mauna Loa Pk. Dr., Fremont
South Bay Piston Poppers, G. P. Burton
3547 Platt Ave., Lynwood 90262
So. Calif. Aero Team, C. W. Bogart
469 Paulette Place, La Canada 91011
Scamps, James E. Adams
2538 N. Spurgeion St., Santa Ana
S. Calif. Ignition Flyers, O Bernhardt
17119 S. Harvard Blvd., Gardena 90247
900 Club, Ken Kullman
3698 Magellan Ave., Santa Clara 95051
Thermal Thumbers, Russell D. Johnson
7891 Cramer St., Long Beach 90808
Thunderbugs, John Boang, Jr.
1320 Welton Way, Inglewood 90302
Tracy Skyliners, Robert Holderbein
124 Lagune, Tracy 95376
Tri Valley RC Modelers K. E. Johnson
704 North F St., Lompoc [redacted]
Tustin Model Club, D. Willoughby
14695 Candida Place, Tustin 92680
Vaca Valley RC's, Capt. R. L. Woods
101 Ohio, Travis AFB 94535
Vanden Aero Club, Brian N. James
Markeley Lane, Travis AFB 94535
Ventura Cty. Comets RC Club, C. Hays, Jr.
537 Merritt St., Camarillo 93010
Willing Able Modelers, Myrtle Coad
228 Culp Ave., Hayward 94544
The Woodland RC Club, D. Barton
12 Hays Street, Woodland 95695

COLORADO

Grand Junction Modlr's W Hoaglund
2210 Hall, Grand Junction 81501
Jefco Aeromodelers, Steve Mangels
1667 South Stuart, Denver 80219
Magnificent Mountain Men, Glenn Reed
408 S. Uvalda, Aurora 80010
Mile-Hi RC Club, Lloyd Nicholson
1257 Willow, Denver 80220
Model Museum Flying Club, C. A. Warren
3010 Third Street, Boulder 80302
Pikes Peak RC Club, Bart Hayhurst
1219 Oswego, Colorado Springs 80904

CONNECTICUT

Central Conn. RC, Richard Coan
19 Saddle Hill Circle, Newington
Hornets MAC, John Scott
Witches Rock Road, Bristol 06010
Middlesex Aero Modelers, R. A. Doak
389 Main St., Portland 06480
Northeastern Drone Soc. Inc., R. Hamel
Star Route 6, Columbia 06237
Northern Ct. RC Club Inc.
PO Box 205, East Granby
Nutmeg RC Flyers, Davis Sandulli
Old Town Farm Rd., Woodbury 06798
RC Control Club of Conn., Phil D'Ostilio
116 Ronald Dr., Fairfield 06430
Radio Control Prop Busters, R. Wilkins
Blood Street, Lyme 06371
So. Ct. Aero Modelers, John Whittles
43 Farview Avenue, Saybrook 06475
Trumbull RC Club, Edmund J. Richter
6 Greenhaven Road, Trumbull 06612

DELAWARE

Delaware RC Club, William Northrop, Jr.
56 Holly Lane, Newark 19711
Dover Mosquitos, William H. Gottorf
PO Box 336, Dover 19901
Flying Blue Hens, Steven Bailey
1125 Bardell Dr., Sherwood Park 11.
Wilmington 19808

DISTRICT OF COLUMBIA

See Maryland and Virginia listings.

FLORIDA

Aero Modelers of Perrine, P. A. Hendricks
11742 SW 176 Terrace, Miami 33157
Baron RC Club, G. J. Voelkel
141 S. State Rd., Ft. Lauderdale
Daytona Beach RC Assn., Joan Calder
1349 Bird Ave., Daytona Beach 32014
Ft. Lauderdale Modelers, E. H. Claggett
33 SE 2nd St., Ft. Lauderdale 33301
Guided Mites, Thomas P. Tidwell
[redacted] Meigs Drive, Shalimar 32579
Gulf Hawks MAC, Roger Rowley
1515 - 26 Ave. N, St. Petersburg
Imperial RC Club Inc., Louis Lavine
200 Collier Drive SE, Winter Haven
Indian River Kontrol Soc., James Bloor
1917 Cedarwood Drive, Eau Gallie
Jacksonville Free Flight Team, T. Tibbs
8015 Parker School Rd., Jacksonville
Moonport Modelers, Rex F. Hinson
1723 Smith Dr., Titusville 32780
N A M E, Art Norman
No. 25 3131 E. Tamiami Trail, Naples
Orlando Aerobats, Thomas E. Brooks
4206 Belvidere St., Orlando 32809
Palm Beach Aeronauts, Earl Harvel
270 NE 16th St., Delray Beach 33444
Pensacola Aeromodelers, E. Cawby
861 Petunia, Pensacola 32505
RC Club of Jacksonville, R. S. Mobley
PO Box 8626, Jacksonville 32211

Sarasota Piston Poppers, J. H. Suponic
1272 Suponic Ave., Sarasota 33580
Seminole RC Club, Paul E. Speh, Jr.
1905 High Road, Tallahassee 32303
Spaceport RC'ers Inc., R. R. Medved
1995 Temple Ave., Merritt Island
Suncoast Aero Modelers, J. A. DeMeritte
630 Regina Rd., Dunedin 33528
Tropic Aeros RC Club, Charles R. Quick
1975 NW 36th St., Miami 33142
Tampa RC Air Craft, Inc., Phillip Cota
4926 E. Broadway, Tampa 33605

GEORGIA

Albany MAC, Frank E. Watson
101 Marian St., Albany 31704
Atlanta RC Club, R. L. Lamb
2479 Paul West Drive, College Park
Cobb County RC Modelers Club, R. Reed
916 Piedmont Circle, NE, Marietta
Dixie Maxers, Harry Grogan
980 Concord Rd., Smyrna [redacted]
The Flying Griffins, Harry Worthy
407 Northside Dr., Griffin 30223
Golden Isles RC Club, John Frederick
231 Cornwall, Brunswick 31520
Robins Model Flyers, C. J. Manspeaker
PO Box 546, Warner Robins 31093

HAWAII

Hawaii RC Club, Ernest J. Bob
94 - 1072 Lumiaina St., Waipahu
Kapiolani RC Club, Edward Kuramoto
806 - 17th Ave., Honolulu 96816

IDAHO

Boise MAC, Robert S. Seng
8731 Brynwood Drive, Boise 83704
Palouse Ridge Runners, Jack Smetana
Box 65, Moscow 83843

ILLINOIS

Aero Angels, Thomas Hojnacki
5655 West School St., Chicago 60634
Aero Telemechanics, Inc., Jack Burns
827 East Ave., Oak Park 60304
Alton Area Thunderbolts, R. Rice
444 Valley View Drive, E. Alton 62024
Centreville Cadets, Robert O. Britt
307 Agnes Drive, O'Fallon 62269
Champaign Urbana Aeronauts, J. Jaycox
1902 Augusta Dr., Champaign 61820
Chicago Aeronuts, Peter J. Sotich
3851 West 62nd Place, Chicago 60629
Chicago Scalemasters, Robert Talchik
3851 W. 70 Place, Chicago 60629
Chicagoland RC Modelers, Inc., G. Leonard
142 Wilwood Place, Elk Grove 60007
Cisne Flying Aces, Orville Dickey
Rt. 2, Cisne 62823
Decatur Blunder Birds, Jack C. Lange
Route 7 Box 359, Decatur 62521
Du Page Thermal Riders, Hans Draayer
832 Lyford Lane, Wheaton 60187
East Side RC, Harry Ryks
23 Hampton Drive, Glen Carbon 62034
Flying Fools Mod. AP Club, Bill Homan
604 Wood St., W. Chicago 60185
Freeport Mod. Air Club Inc., H. Haenke
815 W. Hamilton St., Freeport 61032
Illinois Model Aero Club, P. J. Sotich
3851 West 62nd Place, Chicago 60629
Illinois Valley RC Club, Howard Halm
920 W. Main St., Ottawa 61350
Joliet RC Club, Wayne Mauer
1255 Vine St., New Lenox 60451
Kishwaukee RC Flyers, L. J. Lynch
7939 S. 7th St., DeKalb, Ill. 60115.
Lakeshore RC Club, Joe Schilling
521 Sumac Road, Highland Park
Lily Lake Air Knockers, W. Morrison
R.R. No. 1, Box 218, St. Charles 60174
Northwest RC Club, Tom Hughes
2945 Applegate Ct., Glenview 60025
Palos Park RC Club, Harry Wood
6750 South 79th Ave., Oak Lawn 60458
Pelican Model AP Club, Robert Elman
17707 Burnham Ave., Lansing 60438
Plug Burners, Robert Ogden
Rt. No. 2, Normal 61761
Quincy Flying Falcons, Lloyd Boden Jr.
613 Hill & Brook, Quincy 62301
RC Club of Chicago, Joseph Mikolaitis
2207 S. Racine St., Chicago 60643
Rockford Aeromodelers, James Bonser
3117 Liberty Drive, Rockford
Sentral Ill. Radio Soc., G. Lenhardt
400 Standish Drive, Bloomington
SKAT, Robert Bentley
426 Brown, Wauconda 60084
Skynights, Robert Bentley
426 Brown, Wauconda 60084
Skylarks RC of Ill., Edward E. Wurtack
256 W. Wilson, Palatine 60067
Springfield Prop Busters, E. C. Campbell
3344 S. 3rd St., Springfield 62703
Springfield Sunday Fliers RC, G. Languell
1404 Fayette Ave., Springfield 62704
Suburban Aero Club of Chi., R. Mullins
4432 W. 17th Place, Country Club Hills
Tree Town Modelaires, Edward J. Tuma
4417 Deconers Dr., Downers Grove 60515
Tri-City Sky Steelers, J. D. Blum
2417 Glen Place, Granite City 62042
West Suburban RC, Joe Novak
542 Park Place, Addison 60101

INDIANA

Converse RC Flying Club, J. A. Rosman
226 E. 50th St., Marion 46952
Eastern Ind. RC Assn., Joseph Fallon
1720 E. Main Street, Richmond 47374
Evansville RC MAC, A. W. Kleinhans
1121 Jefferson Ave., Evansville 47714
Flying Bottle Necks Club, Donald Case
Box 538, Monroeville 46773
Flying Fools, Bill Adams
326 W. Silver, Bluffton 46714
Fort Wayne Flying Circuits, B. Bowen
2212 Reckweg Avenue, Ft. Wayne 46804
Griffith Barnstormers MAC, C. Wright
207 N. Lafayette, Griffith 46319
Hamilton Flying Modelers, Paul Bennett
5745 Susan Drive, E., Indianapolis
Indianapolis RC Modelers Club, J. Pursell
650 N. Oxford Street, Indianapolis
Indianapolis W. Side RC Mod., F. Feeney
5302 N. Delaware St., Indianapolis
Lafayette Cloud Jockeys, Phil Conlon
PO Box 8, Mulberry 47058
Maple City Modelers, Roland Hodgson
Rt. No. 4, Box 194, Goshen 46526
Midwest Sundowners Flying Club, J. Wallin
Box 159A, Sunset Dr., Chesterton
N. Ind. Model Aero Assn., C. Bedwell
[redacted] S. Mayfair, Chicago Hts., Ill.
Tri-Valley RC Club, Jerry Smith
16390 Chandler Blvd., Mishawaka 46544
Whitewater Val. RC Model Club, O. Napier
Rt. No. 1, Liberty 47353

IOWA

Balsa Busters, Ken Taylor
1600 Grand Ave., Council Bluffs
Black Hawk RC Pilots, Robert Nelson
802 Hanna Blvd., Waterloo 50701
Central Iowa Buzz Bugs, Eugene Pippin
Rt. No. 2, Marshalltown 50158
Davenport MAC Inc., Richard A. Mairet
3009 Westman Drive, Bettendorf 52772
Des Moines Modelaires, Roy A. Stack
1106 - 68th Street, Des Moines 50311
Dodger RC Club, E. L. Knowles
925 South 27th, Ft. Dodge 50501
Model Manglers of Iowa, Chuck Cotham
4517 - 65th St., Des Moines 50322
The Flying Red Barons, Andrew Kerkhoff
1615 Des Moines, Keokuk [redacted]

KANSAS

Hi Plains RC Club, Beryl Mowry
R. R. No. 2, Box 57, Kinsley 67541
Mid America Radio Controlers, J. Parker
727 Leland, Topeka 66607
Shawnee Mission RC Club, G. Anderson
5645 Barkley, Shawnee Mission 66202
Wichihawks, Edward W. Salguero
1301 Gretchen Lane, Wichita 67206
Wichita RC Club, Art Malever
6418 E. 15th Street, Wichita 67226

KENTUCKY

Central Kentucky RC Club, Harold Lemay
221 North Limestone, Lexington 40502
Lexington MAC, Dennis Suvanto
1733 Traveller Road, Lexington 40504
Syntonic Aero Club, Don Witt
141 Ohio Avenue, Fort Thomas 41075

LOUISIANA

Acadian Radio Control Club, R. Lawson
214 Summit Drive, Lafayette 70501
Dyna Soarers MAC, Albon Seither Jr.
7520 Weaver Street, New Orleans
Ouachita RC Soc., James C. Ramsey
107 Westwood Dr., W. Monroe 71291
SHARKS, James E. Nuttall
5121 Sussex, Shreveport 71108

MAINE

Presque Isle Mod. Aero Club, J. Bouchard
103 Cantebury St., Presque Isle 04769

MARYLAND

Aero Masters MAC, Thomas Prentice
3021 Stranden Rd., Baltimore 21203
Baltimore Aero Craftsmen MAC, H. Weil
3606 Monterey Road, Baltimore 21218
Chesapeake Bay RC Club, A. J. Davis
600 Cromwell Street, Baltimore 21225
Cumberland Aircraft Model Soc., C. Jones
Bowling Ave., Bowling Green, Cumberland
DC Maxecuters, John Thornhill
RFD No. 1, Mt. Airy 21771
DC RC Club, Inc., Carl P. Maroney
11429 Cherry Hill Road, Beltsville
Flite Streaks Model Club, L. Lauer
831 Lannerton Road, Baltimore 21220
Frederick Model Airplane Club, J. E. Patton
Route No. 5, Frederick 21701
Meade Modelers, Attn: M22
National Sec. Agency, Ft. Geo. Meade
Mid Atlantic RK Society, Allen Smith
PO Box 614, Cambridge 21613
National Capitol MAC, Howard Bizzell
1500 Kanawha St., Apt 103, Adelphi
Pegasus RC MAC, Larry Miller
533 N. Mulberry Street, Hagerstown
RC Modelers of Baltimore, Inc., J. Green
Route No. 2, Box 116, Phoenix 21131
Suburban Md. MAC, Wayne Knowles
25304 Woodfield Rd., Damascus 20750
Westminster Aero Mod., Bobby's Hobby
65 East Main St., Westminster 21157

MASSACHUSETTS

Cape Ann RC Model Club, Robert Smith
239 Central St., Towley 01969
Charles River RC Club, Dr. A. Spievack
6 Old Dee Rd., Cambridge 02138
Charles River RC Club, Nelson Whitman
Round Hill Rd., Lincoln 01773
Franks MAC, Frank Baptista
172 Coffin Ave., New Bedford 02740
Hampshire Co. RC, John Papageorge
104 Rocky Hill Rd., Hadley 01035
Lawrence Air-Istocrats, Thomas Gray
21 Webb St., Methuen 01844
New Bedford Model AP Club, C. Robinson
8 Rodney St., New Bedford 02744
New England RC Modelers, James Facey
25 Appleton Place, Leominster 01453
New England Wakefield Group, S. Colson
47 Sammett St., Everett 02179
Northshore Model AC Assn., D. Reagan, Jr.
6 Ridgeway Ct., Lynn 01900.
North Plymouth Balsa Bugs, L. Wirzburger
92 Nicks Rock Road, Plymouth 02360
Precision Modelers Assn., Phil Hinson
26 Bates Avenue, So. Weymouth 02190
Springfield Area RK'ers, W. H. Sargent
[redacted] Circle Dr., West Springfield

MICHIGAN

Aero Radio Club, Kenneth L. Eckerle
1175 Legion Road, Corunna 48817
Ann Arbor AirFoilers, Richard Bremer
3249 Lockridge Dr., Ann Arbor 48104
Detroit Balsa Bugs, Walter Hartung
14759 Kilbourne Ave., Detroit 48213

East Wings Model Club, Charles Jourdan
4690 Somerset, Detroit 48224
Flying Robots RC Club, Anthony Corradi
34641 Sansburn, Westland 48185
Grand Rapids RC Club, John W. Wolfin
3971 Causeway Dr., Rt. No. 1, Lowell
Indian City RC Club, Raymond Kurnik
7636 Melvin, Westland 48185
Jackson RC Club, Jeffry McEllis
5604 Holly Drive, Jackson 49201
Lansing Flying Aces Inc., C. Spencer
236 Theo, Lansing 48917
Lapeer RC Assn.,
1133 W. Brocker Rd., Metamora 48455
Michigan RC Society, Willard Vignoe
20817 Sunnydale, Farmington 48024
Midwest RC Soc. Inc., Jack Josaitis
23663 Lawrence, Dearborn 48128
RC Club of Detroit, Mrs. Helen Brett
18864 Millar Road, Mt. Clemens 48043
Saginaw Valley RC Club, Gerald Gill
2020 Lone Road, Freeland 48623
Seaway Radio Control Club, D. Wilson
1775 Manz, Muskegon 49442
Signal Seekers Society, Davie Mullen
6231 Penrod, Detroit 48228
Southwestern Mich. Whirlwind, J. Bloom
3569 Arbor Street , St. Joseph 49085
St. Clair Shores Modelers, S. Giacchina
30737 Primrose Drive, Warren 48093
Strathmoor Model Club, David Marshall
14350 Flanders, Detroit 48205
Tri Valley RC Club, Robert Shene
2317 S. 14th Street, Niles 49120

MINNESOTA

Central Minnesota RC'ers, Jerome Voight
Rt. No. 3, St. Cloud, 56301
Golden Eagles MC, Newstrom's Hobby Shop
C. J. Newstrom, Alexandria 56308
Minneapolis MAC, David Edmonson
953 Beacon Lane, Rosemount 55068
Minneapolis Piston Poppers, D. Leonardi
1042 17th Ave., SE, Minneapolis 55414
Rochester Aero Mod. Soc., D. Terrell
314 15th Street NE, Rochester 55901
Twin City RC Inc., Chuck Welliver
6340 Newton Avenue S., Minneapolis
Twin Ports MAC, Romeo Bachand
2130 Miller Trunk Hwy., Lot 316, Duluth

MISSISSIPPI

Meridian RC Club, Ron McCallum
Box 11 NAS, Meridian

MISSOURI

Hot Heads MAC, William Rech
10821 St. Xavier Lane, St. Ann 63074
KC Northern Knights MAC, G. C. Thompson
1114 E. 44th St., N., Kansas City
Kansas City RC Assn., Dale Linthicum
11301 E. 47th, Kansas City 64133
Kirkwood Thermaleers, Inc., R. Hotze
673 Craigswoods Drive, Kirkwood
Lafayette Esquadrille, A. C. Vogele, Jr.
703 Connie Lane, Manchester 63011
McDonnell FF Club, Wm. C. Moody
7770 Woodale Lane, Normandy
McDonnell RC Club, Albin Signorino
11959 Glenvalley Drive, Bridgeton
St. Charles Phantom Flyers, Fred Creasy
1201 Park Side, St. Charles 63301
St. Louis Yellow Jackets, Art Schaffer
4206 Virginia, St. Louis 63111
Signal Chasers RC Club, Alan Winheim
1916-B President, St. Louis 63118
Sky Devils of Kansas City, B. Wright
2818 Collin, Independence 64052
Spirits of St. Louis RC, M. Goffinet
13025 Montmarte Rd., Creve Coeur

MONTANA

Big Sky RC Modelers, Bruce K. Weed
2325½ 2nd Avenue, N., Great Falls
Helena Flying Tigers, Ernest R. Pearce
Box 151, East Helena 59635
Bozeman Air Tragedy Soc., N. A. Shyne
302 S. Grand Avenue, Bozeman 59715

NEVADA

Reno Radio Control Club, M. Douglass
1240 Manhattan St., Reno 89502

NEBRASKA

Mid Nebraska Model Club, Fred Lohman
3307 Lakeview, Kearney 68847
Aero Design Flying Club, D. Reiber
2745 E. Street, Lincoln 68510
Hastings Skylark, L. J. Schmidt
Pauline (PO Glenvil) 68941

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Variations Add to RC Scale Entries in Calif. Meet

With interest in the **RC Bees** model airplane club high for holding an RC Scale contest, but with known scale planes in the immediate area of the California club counted at just seven, the AMA chartered group decided to introduce variations in order to entice builders of many more border-line scale models to compete. This buoyed the entry list to 20 and provided an interesting contest.

Events flown during the September 6-7 AMA sanctioned meet were (1) FAI Scale, (2) "Dirty" Scale and (3) California Scale, A and C Patterns. The latter is judged for scale factors at a distance of 20 feet from the model — pretty hard to discern minute scale characteristics from there.

An added feature was a free style stunt exhibition for biplanes. This event, for which a special trophy was provided, was flown each of the two days at lunch time — a real crowd pleaser.

The contest proved to be good entertainment for both spectators and contestants. One of the well known West Coast Pattern flyers was heard to make the remark that everyone watched each time a scale plane was flown — here was something different. At a Pattern contest all the planes often are similar, and little attention generally is paid to each flight.

"I watched as did others as **Wallace Hurley's** red Fokker DVII took off and proceeded through the maneuvers," said **Whitey Pritchard** who supplied this report and the accompanying photos. "The heads of the people were as if servoed; in unison the heads moved right, left, up or whatever direction the Red Baron took."

Different as night is from day was the flying of the Formula I Pylon Racer by **Bob Francis** in the C Pattern California Scale event. The speeding racer could perform all of the maneuvers, some waived, yet the precision of flight scored enough points for him to win second place.

First place in FAI Scale went to **Stan Powell** of Sacramento, Calif., who flew a Nieuport XI built from a Proctor kit — close in every respect to the original Nats winning model. First place in C Pattern California Scale was taken by **Chuck Fuller** with a F4U Corsair even though he had a spectacular crash when his model ran out of fuel, and Class A Pattern California Scale was won by **Dave Lange** flying a white Shoestring Pylon Racer. "Dirty" Scale winner was **Jim Sunday** with a PT 17.

Rex Geivett received trophy from Jerry Arana for best biplane free style exhibition on Saturday. Model is original fiberglass stunter.

Jim Sunday's PT 17 took first place in the "Dirty" Scale event sponsored by the AMA chartered RC Bees of Santa Cruz County, Calif.

Winners (R to L): Stan Powell, Nieuport XI, FAI Scale; Chuck Fuller, Corsair, Calif. Scale C Pattern: Dave Lange, Shoestring, Cal/A/Pat.

AMA News Bits

Prizes for Everybody

Not many meets are able to do like the **Eastern States RC Championships** and award a prize to every contestant who flew. This was a whopping lot of prizes as there were 122 entries for the one-day meet last October at Pittstown, N. J., sponsored by the **AMA chartered Central Jersey RC Club.**

Class A Pattern with 50 entries was the most highly contested; runner-up event was RC scale with 26 entries. Trophies were awarded to 15th in A Pattern (other prizes to 50th), trophies to 10th in other events.

With contest hours from 8:25 a.m. to [illegible] p.m., every flyer who wanted to [illegible] able to make three Pattern flights and two Scale flights according to **Contest Director Leon Shulman.** Quite a record for a single day meet, we would say.

1970 is Toledo's 16th

Seems a little hard to believe that the 1970 running of the **Toledo RC Conference** will be the 16th time for this annual winter RC spectacular, sponsored by the **AMA chartered Weak Signals RC Club.** Dates and place are February 28 and March 1 [illegible] Lucas County Recreation Hall, Maumee, Ohio. Contact the Weak Signals RC Club, P. O. Box 5772, Sta. Wernert, Toledo, Ohio 43613, for a program, list of area motels, and special features of this year's conference.

District II Associate VP's

Art Schroeder (18 Spencer Rd., Glen Ridge, N. J. 07028) and **Jim Moynihan** (123 Evergreen Dr., Tonawanda, N. Y. 14150) have been appointed by **Dist. II AMA Vice President Bill Boss** to serve as associate vice presidents during 1970. For the AVP story, see page 46 of the October 1969 *American Aircraft Modeler.*

Schroeder will provide increased representation for AMA members in the New Jersey area of District II while Moynihan will cover the northwestern portion of New York State. Members in New York City and Westchester areas will continue to be represented directly by Boss.

RC Pylon Racing League

The **Ft. Worth RC Thunderbugs** club was host to the 2nd 1969 AMA sanctioned meet of the newly formed **Southwest Pylon Racing League.** The Thunderbirds won its second victory with [illegible] points while the Dallas and Houston teams were second and third with 44 and 36 points.

The league concept is much the same as that employed in many sporting events where local areas form teams to compete in [illegible] circuit of meets alternately hosted by the different league teams or their clubs. Information [illegible] obtaining a "franchise" in the Southwest Pylon Racing League may be had by contacting **Bob Lutker,** 3105 Cockrell Ave., Ft. Worth, Tex. 76109.

1969 NFFS Service Award

The **National Free Flight Society Service Award** for 1969 has been given to **Ray de la Veaux** of Philadelphia, Pa. "We just can't say enough about your wonderful help to the Society [illegible] 'our [illegible] [illegible] Willow Grove'," said NFFS Executive Director **Chuck Broadhurst** in communicating the award. "The time you spent, the great work you accomplished, and the care and precision which you devoted to helping [illegible] all at the Nats were something that we will all appreciate for a long time to come."

RC Pylon Race Primer

AMA Contest Director John E. Acheson has been [illegible] member of the **National Miniature Pylon Racing Association** (NMPRA) [illegible] its formation, but he has had little success in getting others in his area interested in RC Pylon Racing. That is, he has had little [illegible] until the Fly for Fun Meet sponsored by the **AMA chartered Flying Bottlenecks Club** last August at Monroeville, Ind.

The fun fly had in it just enough timed flying so that when the event ended, everyone said, "Let's race!" One of the timed fun fly events consisted of takeoff, [illegible] loops and carrier landing (time penalty for not hooking first carrier arrest line). The other event, also timed, was for takeoff, three laps around the Pylon Race course, and carrier landing.

RC Speed Record?

Maybe, but not for airplane speed. The possible "record" is for making a takeoff, doing three loops and landing — in just 21 seconds! This remarkable feat was the achievement of **Jim Carey** in the Fun Fly

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Photos from the AMA chartered SCAMPS (Southern California Antique Model Plane Society) Texaco Trophy Championships earlier this year. Left, last year's winner and son, standing, with Super Cyclone-powered Flying Quaker of 5½ pounds. Right, Contest Director Sal Taibi doles out flight fuel to Gene Wallock at the rate of ¼ oz. fuel per pound of airplane weight — like the old days.

Chartered Clubs

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NEW HAMPSHIRE

Concord Aeroguidance Soc., Garner Prest
24 Rumford Street, Concord 03301
S. New Hampshire RC Club, W. Fitzgerald
205 Wilkins St., Manchester 03102

NEW JERSEY

Atlantic City Sky Blazers, Warren Ward
1250 Monroe Avenue, Atlantic City
Burlington County RC Club
PO Box 121, Rancocas 08073
Central Jersey RC Club, Ted Morlock
567 Darwin Blvd., Edison 08817
Esso Engineering Club, J. S. Clarke
419 Manor Avenue, Cranford 07016
Garden St. Circle Burners, W. Swentzell
Sunset Court, Montville 07012
Jersey Coast RC Club, Joseph W. Smith
26 Colgate Drive, S. Tomas River
Jersey Tailwinds, George Snyder III
283 S. Fellowship Rd., Maple Shade
Mercer County RC Soc., H. M. Harger, MD
31 Bayberry Road, Trenton 08618
Monmouth MAC, Inc., Joe Friend
62 Joy San Terrace, Freehold 07728
N. Jersey RC Club, Everett M. Woodman
[illegible] Floral Lane, Saddle Brook 07662
Philadelphia Sky Pirates, Al Bennett
620 E. Main St., Moorestown 08057
Prop Snappers MAC, John A. Monts
7 Rupells Road, Clinton 08809
Rockaway RC Club, Ed Hoffman
153 Carpenter St., Belleville 07109
Rockland County RC Club, P. Buzzeo
20 Lochmund Ct., Old Tappan 07675
Sky Furys MAC, Terry Howells
Brown Lane, Clayton 08312
South Jersey Flyaways, J. J. Gamble
603 State Rd., Mantua 08051
Thunderbirds, E. Franklin
226 Harrington St., Bergenfield 07621
Top O'New Jersey RC Club, H. W. Hatton
Box 568, Hopatcong 07843
Tri-County RC Club, Cecil Snyder
1297 Jackson Dr., New Brunswick
Vineland MAC, Paul H. Andrews
Rt. No. 3 Box 260, Millville 08332
West Jersey RC Club Inc., F. Dougherty
372 Lycoming Avenue, Wenonak 08090
West Jersey Radio Flyers, R. Viebrock
17 Deerhead Drive, Boundbrook 08805

NEW MEXICO

Clovis Mads, Howard R. Danforth
1008 Thornton, Clovis 88101
South West Aero Team
6212 Katson NE, Albuquerque 87109

NEW YORK

Aeroguidance Society, Inc.,
Box 52, Endwell 13760
Aero RC of Syracuse, Gabriel Elia
514 Ulster St., Syracuse 13204
Balsa Busters, Milton Greene, Jr.
Rt. No. 2, Scio 14880
Blue Angels RC Club, Martin Meyer
79 Charles St., New Rochelle 10801
Flying Knights of Hamburg, Richard Lang
6989 Omphalis, Colden 14033
Flying Knights MAC, Jean Hultberg
Route 1, East Nassau 12062
Green Bush Pilots, John Blaylock
PO Box 805, North Chatham 12132
Hudson Valley RC, Inc., Ed Engleshorn
10 Winthrop Dr., Peekskill 10566
IBM RC & Model Club, Charles Davies, Jr.
7 Volino Dr., Poughkeepsie 12603
Island Model Plane Soc., George Haber
67 Whaley Avenue, Bethpage 11714
Kingston Aeromodelers Club, Lou Auletta
P. Crest Estates, Box 320, Rosendale
Lazy Eight RC Club, Harold Coyle
16 South Sec. Avenue, Broadalbin
Long Island Drone Soc., Inc., J. Holmes
216 Sherman St., Westbury 11590
Long Island RC Club, W. F. Schmidt

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AMA News Extra .....

FAI BANS FF "PIPES", INTRODUCES RC PYLON RACING & SOARING

The annual plenary meeting of the Federation Aeronautique Internationale (FAI) Committee for International Aero Modeling (CIAM) was held in Paris, France, on November ■ and 7. This is the group responsible for establishing rules and procedures for models relating to World Championships, International Contests and World Records. By exclusive franchise from the National Aeronautic Association, the AMA is the U.S. representative to this important group. The most significant decisions taken at the meeting follow.

Free Flight. No changes were made to model specifications, but for Power models, use of tuned exhaust systems is prohibited, and the fuel formula ■■■ consist of 75% methanol and 25% castor oil. (The former 80/20 formula and the proposal to include isopropanol were both rejected.) For Nordic gliders, the release or throwing of the towline is prohibited. In all FAI FF classes, binoculars may be used for timing; however, the CIAM FF Subcommittee will later issue instructions regarding how the binoculars will be used. Sweden reaffirmed its offer to hold the next FF World Championships in 1971.

Control Line. Beginning in 1971, mufflers will be required for Stunt models. In Team Racing two proposals were passed; these (a) permit the pilot to put one foot outside the center circle during a pit stop and (b) increase the warm-up period from the previous one minute to ■■■ minute and 30 seconds. Belgium is planning to hold the 1970 CL World Championships August 19-23.

Radio Control. Several changes were made to the Aerobatic rules. The pilot will have 10 minutes total in which to start the engine and complete the maneuvers; but he must start his engine in the first three minutes. If the engine stops during takeoff it may be restarted, but no score will be given for the takeoff maneuver. Only ■■■ attempt will be granted for each flight. It now becomes mandatory for the pilot to announce the start of takeoff as well ■■ all other maneuvers except landing. The sequence of maneuvers was altered to the following schedule: Takeoff, Figure M, Double Immelman, 3 Outside Loops, Cuban 8, Slow Roll, 3 Inside Loops, 4 Point Roll, Straight Inverted Flight, ■ Horizontal Rolls, Horizontal 8, Top Hat, 3 Turn Spin, Rectangular Approach and Landing. (Several old maneuvers--Inverted 8, Rolling Circle, Tail Slide and Vertical 8--were deleted; a 4 Point Hesitation Roll was inserted, and the Double Stall Turn was redefined as ■ Figure M--the second stall turn is in a direction opposite to what it was in the double stall turn, ■■■ longer needs to be flown in a direction away from the pilot.) Great Britain is planning for the Aerobatic WC in 1971, and Italy has asked for it in 1973.

The U.S. proposal for FAI RC Pylon Racing patterned after Formula II ■as adopted by the CIAM on ■ provisional basis with a few changes. The FAI rules call for the .40 cu. in. engine, minimum model dimensions basically the same as Formula II except for rounding off to metric dimensions, and racing in the same fashion as provided by AMA rules. The main differences from Formula II: min. dia. prop spinner not required by FAI; wheels may be retractable in FAI; wing and stab area is added together by FAI rules--must be 697.5 sq. in. or larger; fuel is limited by FAI rules to a single formula of 75% methanol and 25% castor oil; an effective engine silencer is required; the organizer of an FAI RC Pylon Race has the option of deciding the winner by accumulation of race points (same as Formula II) or by the best single clocked race time.

RC Gliders. FAI provisional rules for thermal and slope soaring were adopted. Basically, the thermal rules are for duration with one point per second of flight, along with a bonus of 50 points for landing in ■ 25-meter circle. Towline length is 150 meters, and the suggested max flight is six minutes. The slope soaring event involves distance travelled back and forth over a 100-meter course during a six-minute flight period.

Scale. World Championship status for both Control Line Scale and Radio Control Scale was granted. Great Britain will be the first host (both CL and RC) August 27-31, 1970.

Indoor. Romania confirmed its intentions to hold the Indoor World Championship, with flying to be in a huge underground salt mine. Dates are April 9-12, 1970.

CIAM Election. Officers for 1970: S. Pimenoff, Finland, president; R. Cerny, Czechoslovakia, vice president; M. Hill, U.S., secretary; R. Moulton, Great Britain, technical secretary; S. Roselund, Sweden, CL Subcommittee chairman; L. Bovo, Italy, FF Subcommittee chairman; J. Patton, U.S., RC Subcommittee chairman; H. Stine, U.S., Rocket Subcommittee chairman.

Representatives of 24 countries attended the November CIAM meeting. The U.S. delegation included Maynard Hill, voting delegate and chairman of the RC Subcommittee; John Patton, AMA president; John Worth, executive director; and G. Harry Stine, chairman of the Model Rocketry Subcommittee. Bryant Thompson, who will manage the first U.S. World Championship Rocketry Team, also attended to observe (at his own expense).

By special arrangement with the publisher this page is produced ■■ the very last minute, just before the magazine is printed, to bring you the latest ■■■ concerning current Academy of Model Aeronautics events of national significance.

AMA News

Continued from page 52

of the **AMA chartered Kansas City Radio Control Association** last September. According to *Contacts*, the club's paper edited by **C. W. Reed III**, Carey's trick was to do the loops in cross-wind and to let the hefty breeze, 20-25 mph, blow the model into landing position. Then, with courage like Carey's, just cut the power and land on the last loop.

Help for Ready-Builts

In the firm belief that the engines of ready-to-fly airplanes (and cars) very rarely are defective — that starting problems occur mainly because the owners are inexperienced — Chicago's **Stanton Hobby Shop** is teaming with department store hobby shops, from whom many of the planes or cars are purchased, in a plan to teach engine starting. Through the simple mechanics of a participating department store inserting Stanton's "Free Start" coupon in the ready-built kits, Stanton hopes to get modelers started off on the right foot regardless of where the models were purchased.

RC Glider Duration/Spot Landing

One of the special events of the 10th Annual Model Air Show sponsored by the **AMA chartered Utah State Aeromodelers** last August 30-31 was for RC Glider Duration/Spot Landing. The event was scored by multiplying distance in feet (from first ground contact to the spot) by the number of seconds difference of a four-minute duration glide. Example: flight of 3 mins., 50 secs., landing 5 feet from spot would be scored 10 (secs.) x 5 (ft.) equals 50. The flight with the lowest single score [redacted] the winner. In the USA meet there [redacted] no limit to the number of flights, and allowable methods of launch included tow, high-start, power pod, etc. Timing for duration commenced when the glider was off tow or off power.

Meet Profits Sponsor Junior

Profits from operating the **AMA sanctioned 1969 Hurricane Meet** at Sebring, Fla., last October, will be used to help send the Junior age Florida State Champion to the 1970 National Model Airplane Championships. Word of this commendable action came from **Rae W. Fritz**, Contest Director of the meet.

RCCR Golden Screw Award

Dick Smith, secretary of the **AMA chartered Radio Control Club of Rochester**, N. Y., has the doubtful honor of being presented with the club's 1st Annual Golden Screw Award — given to the member who screws the most airplanes into the ground! Squelching the idea that the award to Smith in mid-year might be premature, the club's newsletter, *Airflow*, said that it is doubtful whether any other club member has enough airplanes to give any real competition.

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

Jan. 2-4 — Sebring, Fla. (AAA) 16th [redacted] Orange FF & CL International. Site: Sebring Air Terminal. S. Slater CD, 42 Magnolia, Sebring, Fla. 31014.

Feb. 7-8 — Green Bay, Wis. FF Winter Jamboree. Site: Frozen Green Bay. R. Cowles CD, 2424 Ducharme Lane, Green Bay, Wis. 54301. Sponsor: Green Bay R.U.F. Club.

Feb. 21-22 — Buckeye, Ariz. (AA) Southwestern FF, CL & RC Regional Model Airplane Championships. Site: Buckeye Airport. J. Valenta CD, 3041 E. Shangrila Rd., Phoenix, Ariz. [redacted] Sponsors: AirZona MAC & Arizona RC Society.

Chartered Clubs

Continued from page 52

8 Prospect Ave., Garden City 11530
Meroke RC Club, Inc., Morton Ross
216 Broadway, Massapequa Park 11762
Mohawk Valley RC Modelers, D. Washburn
1574 Elm Street, Utica 13501
Nassau Aero Guidance Soc., R. Matsil
2111 N. Sene Ra Dr., Merrick 11566
New York Sky Blasters MAC, R. Maldonado
182 South St., Apt. 16E, New York
Oswego Valley Model Airs, Paul Harmon
308 Fulton Avenue, Fulton 13069
Pennsylvania Ave., RC Soc., J. D'Amico
9224 Rost Place, Brooklyn 11236
Queens County RC Club, Henry A. Weik
104 Sugar Toms Ln., E. Norwich 11732
RC Club of Rochester Inc., R. L. Smith
[redacted] Steko Ave., Rochester 14615
RC Pulsers of W. NY, Inc., Lyle Hemink
4134 Trailing Dr., Williamsville
RC Soc. of Marine Park, Martin Berman
2249 E. 28th St., Brooklyn 11229
Sky Rovers RC, Gene Decook
164 E. Gibson Street, Canandaigua
Sky Scrapers, Mal MacLean
6 Larry Drive, Commack 11725
Squadrone Escarole, Inc., John Sbare
3240 Baker Avenue, Bronx 10467
Suffolk Falcons, Thomas V. Rosko
[redacted] Pulaski Street, Southampton
Suffolk Wings, Fletcher's Hobby House
2585 Middle Country Rd., Centereach
Sullivan County RC
59 York Avenue, Monticello 12701
Thunderbolts RC Club, Daryl J. Hull
6 Maple Avenue, Albany [redacted]
Westchester Radio Aero Mod., R. Ehrlich
40 Sammis Lane, White Plains 10605
Whiteman Aero Modelers, James A. Dobis
95th Strat. WG, APO NY 09677

NORTH CAROLINA

Charlotte RC Club, Philip J. Welch
1531 Pondella Dr., Charlotte 28213
Cherry Point Model Air Wing, J. Shields
206 Bryan St., Havelock 28533
East Carolina RC, Myron J. Rich
302 Beck Street, Goldsboro 27530
Ft. Bragg MAC, Raymond W. Carpenter
108 S. 6th St., Spring Lake [redacted]
Gastonia Radio Control Club, Reid Sipe
1710 Wildwood Rd., Gastonia 28052
Monroe RC Club, Vern W. Helms
800 Tyvola Rd., Charlotte 28210
Montgomery Randolph RC Club, J. C. Pugh
Box 455 R.F.D. No. 1, Franklinville
Morganton RC Circle, Ben Bailey
Hildebran 28637
North State Aeronauts, Thomas Andrews
1014 N. Main, Burlington 27215
Skymasters of Raleigh, Charles Gilley
5208 Knollwood Drive, Raleigh 27609
Spinners MAC, John Bartley
1330 Country Club Dr., High Point
Tarboro Aeromodelling Club, W. Horne
807 St. Patrick St., Tarboro 27886

NORTH DAKOTA

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Red River RC Club, William Pridemore
848 D Missouri St., Grand Forks AFB

OHIO

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1111 Parkway Blvd., Alliance 44601
Canton Model Soc., Wm. G. Hulbert
174 Castle Blvd., Akron 44313
Capital City Controlliners, C. Hemmerly
5607 Sandalwood Blvd., Columbus [redacted]
Central Ohio FF Club, Floyd Miller
1313 Brookridge Dr., Columbus [redacted]
Central Ohio Old Timers Society
113 West High Street, Fostoria 44830
Cincinnati Aeromodelers, G. Vogeler
[redacted] Carroll Ave., Cincinnati 45211
CORKS, Howard Wilson
5139 Jameson Drive, Columbus 43227
Dayton Buzzin' Buzzards, Dan Rhein
118 E. Poraker Street, Dayton 45400
Dayton Wingmasters, Martin Richardson
7130 Claybeck Drive, Dayton 45424
Electronic Flyers, John Converse
1822 Jamestown Dr., Mansfield 44906
Exterminator Combat Team, D. E. Patton
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FORKS, Ed Heston
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2021 Lakeland, Lakewood 44107
Portage Aero Modelers, F. R. Zuppan
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RC Thermaliers, Westley Stafford
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Ponca City RC Modelers, Norman Barnes
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Ponca Skeeter Pilots, Dale Courtney
1918 Worth 5th, Ponca City 75601
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Salt Plains A. M. Dev., Lt. P. Tradelius
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Tahlequah Muskogee Modelairs, G. Kelly
927 E. Side Blvd., Muskogee 74401
Tulsa Glue Dobbers, Inc., M. M. Duncan
2511 East 6th, Tulsa 74104

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Eugene RC Aeronauts, Inc., M. P. Bailor
3616 Gilham Road, Eugene 97401
Falcons of Portland, Tim Dunlap
8530 Burnside, Portland 97216
Fly-A-Ways RC Modelers Club, C. Felton
356 North 2nd, St. Helens 97052
Nor' Westers, Edwin White
421 SE 141 St., Portland 97233
Stardusters RCMC, R. Pailthorp
2956 Northeast 56th, Portland 97213
Salem RC Pilots Assn., Tony Caragol
2326 E. 34th Street, Albany 97321
Willamette Model Club, R. D. Stalick
2807 South Oak, Albany 97321

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3621 College Ave., Beaver Falls
Brentwood Flying Aces, Robert Volk
138 E. Francis Ave., Pittsburgh 15227
Bucks County RC Club, Joseph L. Fox
25 Lark Drive, Holland 18966
Carlisle RC Club, Roy E. Williams, Jr.
525 S. Hanover St., Carlisle 17013
Erie Model Controliners, James T. Muye
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Ephrata RC Club, Clyde Wealand
207 Main Street, Akron 17501
Erie Model Aircraft Assn., L. Reichel
3301 Cindy Lane, Erie 16506

Fallen Angels, Douglas W. Sorber
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Glenside Air Scouts RC, S. Kieffer
989 Cornell Drive, Warminster 18974
Golden Eagles, John Pasersky
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3057 W. 24th St., Erie 16506
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Keystone RC Club, J. Bachelor
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Laurel Highlands MAC, J. R. Cline
[redacted] Main St., Latrobe 15650
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Mercer County MAC, Charles R. Tuck
Route 3, Greenville 16125
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Meadows, Penna. Furnace 16865
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SPARCS, Jay Gerber
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Rhody Aero Guidance Soc., W. Pasciak
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Sumter Model Airplane Club, C. Johnson
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Western Carolina RC Club, Frank Queen
104 Clearview Avenue, Greenville

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Propbusters RC Club, C. Besancon
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Cumberland Flyers, James R. Petty
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Memphis RC Club
PO Box 27002, Memphis 38127
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Tennessee Valley RC Club, B. H. Sanders
21 E. Mimosa Dr., Chattanooga 37415
Tri Cities Aeromodelers, Gary Paar
216 Blue Haven Dr., Kingsport 37663

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Alamo RC Soc., Inc., Gerald Ingraham
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4111 Shelby, Amarillo 79109
Beaumont RC Club, Don Still
306 Orleans, Beaumont 77701
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Dallas Aeromodelers Assn., Jim Clem
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Dallas Cloud Climbers, Jeannie Peters
526 Blueberry Blvd., Dallas 75217
Dallas RC Club, Donald E. Rardin
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Flying Chapparals, Elton Rodgers
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Houston RC Club, F. C. Truesdell
[redacted] Indigo, Houston 77036
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4701 Richmond Rd., Tyler 75701

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Flyaway RC Club, Col. W. L. Phillips
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Roanoke Aero Guidance Soc., N. O. Poff
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S. E. Va. RC Group, W. C. Conkling
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Tidewater RC Club, Inc., J. W. Raynor, Jr.
5529 Nashua Rd., Virginia Beach 23462

WASHINGTON

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Everett Radio Modelers Assn.,
Box 313, Marysville 98270
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Rt. 4 Box 4100, Baenbridge Island
Kent Strat-O-Bats, Peter W. Young
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Seattle Radio Aero Club, Paul Cole
804 NE 128th Street, Seattle 98125
Sky Raiders MAC, R. F. Stevenson
8326 17th Avenue NW, Seattle 98107
Spokanes Flying Five
N 7014 Howard, Spokane 99208
Tacoma Model Aires, Keith Loutocky
1419 South 48th, Tacoma 98408
Tri City Modelers, Gerald B. Becker
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Organization of RK'ers, H. Michaelis
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Whatcom Aero Modelers Soc., C. E. Crosby
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The Flyin' Hillbillies, J. S. Hudnall
Rt. 1, Shawnee Est., Winfield 25213
Hill Hoppers, William Slaughenhoupt
4 Bethany Pike, Wheeling 26003
Valley IFO's MAC, W. Seckman, III
3000 Fernwood Ave., Moundsville
Vienna Sky Sharks MAC, F. Fluharty
504 21st Street, Vienna 26101
Vulture Flying Club, Jeff Beall
[redacted] 15th Street, Elkins 26241

WISCONSIN

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2336 S. 95 Street, West Allis 53227
Lakeland RC Club, Robert Wischer
Rt. 1 S-221 Lapham Peak Rd., Delafield
Milwaukee Flying Electrons, K. Hanson
457 Baird Avenue, Waukesha 53186
Milwaukee Area RK Soc., Richard Chewning
2197 S. 79, West Allis 53219
Milwaukee RC Flite Line, D. M. Dempsey
1049 Milwaukee St., Delafield 53018
Tri-City RC'ers, Gerald Reinhard
1513 Lincoln Hgts., Beloit 53511
Wausau RC Sportsman, Inc.
640 South 3rd Ave., Wausau 54401

Brian Reitz photo

David Smith receives first place award in the indoor glider spot landing contest of the AMA chartered Tustin (Calif.) Model Club from Dale Willoughby, club adviser. Any type of glider was permitted. Most used the Northwest glider, but Smith designed his own mini-glider.

Ole Tiger

Continued from page 19

Next, assemble the two aileron bellcranks to their 1/16" ply panels and you're ready to assemble the wing.

First, pin the two bottom skin panels, sanded side down, to the building board. Glue the 1/16 x 1/4 spruce bottom in place, wing tip to wing tip, bending it through the center section area, then glue all ribs in place out to bellcrank assembly. Install bellcrank assembly with wire pushrod running through inboard ribs to servo cutout and then complete rib installation. Now add 1/16 x 1/4" spruce top spar, again wing tip to wing tip. Now, add the 1/16" sheet balsa vertical grain pieces from top to bottom spar. These pieces are the most essential pieces in the entire assembly, so cut them to fit and cement them well! Cut aileron pushrod slot through the lower skin, using the slot in the ply crank mount as a guide.

The leading edge and rear spar can be glued in place, immediately followed by the top skin, sanded side up.

The basic wing assembly is now complete and needs only the soft sheet trailing edge and tops glued in place. The entire trailing edge, including ailerons, should be rough shaped before gluing to rear spar (only tack glue in aileron area).

The complete wing assembly should be ready to lift from the building board on the third evening, and you'll be pleasantly surprised to find what a strong wing it is.

We would recommend that the final sanding of both leading and trailing edges, cutting and finishing the aileron

and initial finishing may be applied now.

Fuselage: Fuselage construction is fairly standard. Only two things cropped up that we hadn't done many times before. One is the landing gear. We hadn't seen a really good gear hung from the bottom of a fuselage before, and we also didn't want the bottom of Ole Tiger all fouled up with a sheet metal or two-wire gear. Finally figured out the single leg torsion bar setup shown, and at the next meet we attended, there was the same setup in a Minnow. The gear really works well; we must have had close to a hundred landings and still not a mark on the fuselage.

The second item is forming the boat-bow section beneath the engine. It's much easier to form if the plywood doubler is initially contact-cemented to the fuselage sides from the landing gear rearward. After the basic fuselage box assembly is glued up, pull the ply doubler into the shape shown in the plan view and glue to the firewall bulkhead and at the point. When this has set up, apply contact cement to the formed ply doubler and forward end of the balsa side plate. After setting up, pull the balsa sides in to ply doubler. Forming the sides in this manner will provide the boat-bow without any undue stress being built in.

With the basic fuselage box finished, assembly of the complete model is next. The finished wing, stabilizer and fin are installed, and then the fuselage top formers. Planking the forward fuselage top and sheeting the rear top are next. Now install the nose blocks. With a little careful working in the nose area, especially in positioning the ply spinner plate. Start the nose blocks with the lower block (with the lower engine mount beam epoxied in place). Once this is cemented securely to the top edges of the fuselage sides and the firewall, bolt the engine and upper mount beam in place and cement upper mount to firewall. Now proceed with the side blocks and top block. Work the forward edge of the nose blocks down so that with spinner in place you get the running clearance shown.

We have used the Williams Brothers cheek cowls for simplicity and they have worked out quite well. The L. H. cowl provides a dandy place to install ballast well forward and out of sight.

Ballast will be needed. Our ship ready-to-fly with a Micro Avionics XL outfit, weighed 4 lbs., 6 ozs. and was tail-heavy. With the NMPRA rules requiring 5-lb. minimum weights, 10 ozs. of lead is bolted securely to the lefthand ply cheek-cowl positioner. This brought the ship up to the 5-lb. minimum and also moved the CG aft slightly forward of that shown on the plan. More about this later.

Tail Surfaces: Pretty straight forward here. Use medium to hard balsa sheet for all surfaces as they do take quite a beating.

Finish: We've all got our pet methods of finishing, so have at it in any fashion that suits you. We stumbled onto a method that's not only fast, but provides a pretty decent model when you're done.

We give all surfaces an initial coat of Starcast coating resin (do not use laminating resin). This will set up in about two to three hours. Give it a light going over with coarse sanding cloth to knock off the high points, then flow on a second coat, being careful of runs. When this coat sets up, it should be glass smooth.

Continued on page 62

SUDDEN SERVICE PLANS

Full-Size Plans — Shipped First Class Mail Within 48 Hours — No Extra Charge

No. 0101, Undone I — R/C Pattern plane for 60 engine for new maneuvers and lightweight equipment. Wing span 59". **$3.50**

No. 0102, Skyvan — Semi-scale twin 049-powered STOL transport. Simple construction, all-balsa. For C/L **$1.50**

No. 1191, Scimitar — Unusual-looking R/C stunter. High-speed [illegible] vers, clean tracking, 60 engines. Low-tail Rivets look. By Joe Foster. [illegible]

No. 1192, Ryan Mailplane — Light, F/F, with plenty [illegible] details. For rubber indoor or outdoor. Plan has scale views. **$1.50**

No. 1193, Mig 21d — 40-powered C/L version [illegible] Russian fighter is fast, stable flyer. By Roland Baltes. **$2.50**

No. 1194, 1937 Gas Model — Half-size 049 copy of great old-timer. Has durability and easy-to-fly characteristics. Frank Ehling. **$2**

No. 1091, Halberstadt — Nearly scale R/C WW I fighter with semi-symmetrical 6' wings. 60-powered. Two sheets. **$4**

No. 1092, Sic-Poke — Exotic tail-or-wing-first F/F for tow-line or power. .02 engine on removable pylon. **$2**

No. 1093, Hoopla II — Record-holding rat-racer developed over [illegible] competition. .40 engine. **$1.25**

No. 0791, Pusher Galore — Bill Hannan's all-sheet, rubber pusher for Tenderfoot. Looks like supersonic transport. **$.75**

No. 0894, Voltswagon — Trainer and stunter by Marsh for electric tether flying with slot-car motors. Plans for the pylon included. Great club activity. **$1.50**

No. 0794, Skimmer Airboat — Sled-type fun watercraft by Paul Hook. .09 engine, R/C rudder, throttle. **$2**

No. 0991, Flashby I — Rakish-looking all-balsa ROG by Wayne Brown. For the Tenderfoot. Tricycle gear. **$1**

No. 0992, Fouga Cyclone — Scale model [illegible] jet-assisted French sailplane, by Nick Ziroli. Gains altitude easily on 09 engine. A two-piece 7-ft wing. For R/C. **$3.50**

No. 0993, La Jolita — Profile 15-powered Goodyear C/L racer by James Kloth, fast, groovy. On [illegible] and engine [illegible] 85 mph. **$1.25**

No. 0991, Jungster — Realistic R/C stunter by Leake with swept midwing. 60 powered. Smooth maneuvers. Two sheets. **$3.50**

No. 0992, Taylor Cub F-2 — Sport, F/F, scale, .020. Stick-and-tissue. By Schroyer. **$1.75**

No. 0993, Martin Mo-1 — Rare WW-1 era monoplane, carrier fighter ideal for Class I Carrier. [illegible] keep lines tight at [illegible] speed. [illegible] Reeves. **$1.50**

No. 1191, Junkers D-1—Joe Tschiesi 1918 fighter, proportions for perfect R/C scale. .45 engine. Low-wing has 500 sq. in. **$2.50**

No. 1192, FAI Pussy Cat — On this FF, Earl Thompson [illegible] high thrustline, rear fin, clean lines to hurdle climb/transition gap. Hot .15. **$3.50**

No. 1291, Strato-Streak '65 — Frank Heeb's ½A F/F [illegible] of hottest gas model [illegible] 1941 era. Simple pylon. 275 [illegible] in. **$1.50**

No. 1292, Sky Mite — Small R/C multi by Hibbard has performance [illegible] larger craft. Foam and fiberglass. Span 52". Weight with 4-channel [illegible] 4 [illegible] .19 to .35 engines. **$2.25**

No. 0191, Curtiss-Wright Jr.—Robert Hawkins transformed open-cockpit, pusher [illegible] thirties for single channel. First step into R/C scale. Span 44". Use .049. **$2.50**

No. 0192, Skyraider — Mottin's Navy Carrier, fast, light. .40's or .60's. Easy construction. **$2.50**

No. 0193, Cutie Coupe — Coupe d' Hiver F/F by Dave [illegible] Quick to build with all-sheet surfaces. Your first rubber [illegible] model. **$1.75**

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No. 0291, El Cochino — Bob Morse conventional-design stunter. 57" low-wing. Can [illegible] extended 6" [illegible] R/C trainer. **$2.50**

No. 0292, Emaron — Lauerman/Delaney AMA Class-B Proto record holder, over 150 mph from standing start. Hot 29. **$1.75**

No. 0491, Emeraude — Duke Crow reduced famous home-built to R/C size (65"). .40 to .60, does stunt pat-[illegible] Gentle. Two sheets. **$3.75**

No. 0492, Biceps — Don Tearout's [illegible] Control-Line [illegible] spectacular performer. .60-powered, flies slow, [illegible] neuverable. Two sheets. **$4**

No. 0691, Small Fry Special — Mottin's C/L trainer [illegible] Tenderfoot. Easy to build. An .049. **$.75**

No. 0692, Messerschmitt Bf. 109E — R/C, semi-scale by Munninghoff. Mean look [illegible] [illegible] fighter. Two sheets. **$3.75**

No. 0693, Manta — Howard Kuhn's Boost Glider for model rockets [illegible] to build from sheet. A winner. **$.75**

No. [illegible]91, Jr. Sky Squire — R/C sport-trainer by Jess Kriesor, .09 to .19. From Galloping Ghost to multi-digital proportional. Span 48" (416 sq. in.); 3 lbs. **$2.50**

No. 0892, ½A Sky Squire — Small [illegible] [illegible] Sky Squire. 1 ch. rudder-only, or rudder, elevator and motor on Galloping Ghost. Only 22-28 oz. **$2**

No. 0893, Mustang — Rabe's [illegible] near-scale C/L stunt. Flies pattern with [illegible] S.T. .40. Over 57". **$2**

No. 1091, Olly Bird — Great F/F [illegible] Tenderfoot by Ehling. Easy to build; easier to fly. Cheap. An .020. **$.75**

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No. 0783, Atom—Mottin's Advanced Training Model for C/L. Sheet balsa. Easy flyer. .15 or .19; convert later to larger sizes. [illegible]

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No. A692, Miracle Worker — John Blum's C/L trainer. Combat, carrier, stunt. Easy-to-build profile. .35 engine. **$1.50**

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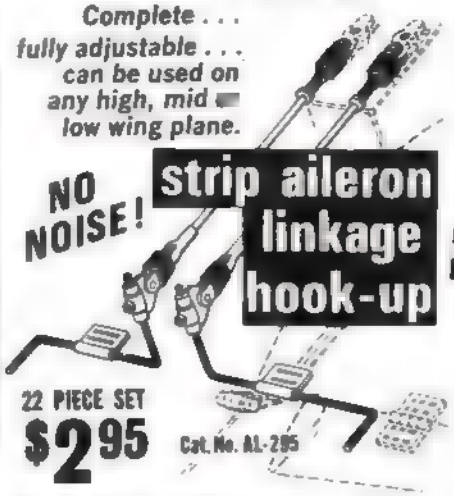

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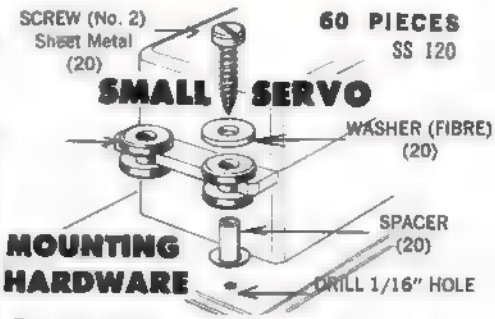

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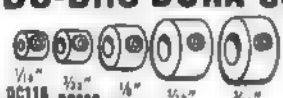

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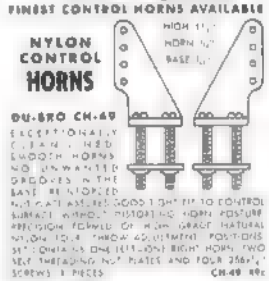

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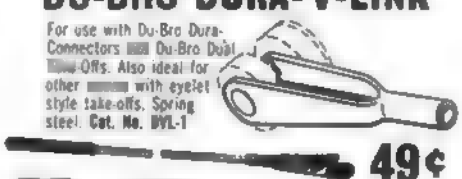

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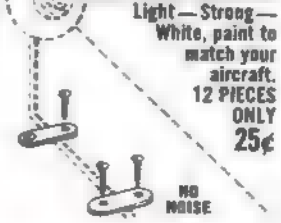

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This second coat should be lightly sanded with 300 wet or dry to remove the gloss. Now spray two light coats of Hobbypoxy color (thinned at least 30%). This should give you a glass-smooth brilliant base color.

We applied the trim and numbers by laying out the design lightly in pencil. Then using an ink ruling pen and compass we outlined all the trim with Hobbypoxy, and then filled in with brushed Hobbypoxy. The colors we used were white all over, red trim and blue pin stripes.

Flying: Only a word of caution, do not attempt to fly if the center of gravity is aft of the position shown on the plans. You will really have a wild one on your hands. Balance the ship at the point shown, or forward of the point shown and you'll have a beautiful flyer that really stays in the groove.

We've heard it said many times by many modelers that they can't fly Formula I ships, just too fast! Don't believe it; the ships are fast, yes, but their speed makes them very responsive, and this quick response makes them a lot easier to fly than the neophyte racer might think. Our attitude is that racing has put a lot of fun back into R/C. We've had much more fun in losing a Formula I race than in winning a pattern event.

Stormovik

Continued from page 25

tional dope will seal loose edges of tissue. The compound curves of this model will necessitate covering in many small pieces to obtain a neat job. Leave the fuselage area above the stabilizer uncovered, so that trim adjustments can be made during flight tests. Shape the wing-position area of the fuselage carefully so that the wing fits on neatly. Be certain that the stabilizer is parallel to the fuselage center-line, and that the wing has the two-degree positive angle shown on the plans.

Ideally, the canopy is molded of thin plastic. Carve a piece of spruce to the canopy shape. A Mattel molder will form the plastic nicely. I have used an oven to soften the plastic and then pulled it over the form. A canopy built up of flat sheets presents a good appearance, however. Add the canopy after the fuselage has its final finish.

Covering the landing gear wires with balsa is tedious and reduces flexibility. It does add to the appearance. Glue the completed gear into the boxes rather lightly so that hard landings will knock the gear free, rather than tear up a wing!

Shape the prop blades by first carving away the underside of the blade. Remove the wood from the rear bottom edge of the block to the top, front edge, but leave the center ½" of the block untouched. Trace the blade outline onto the cleared area, then carve away the rest of the block to the correct blade shape and thickness. For strength leave the blades at least ⅛" thick at the hub. When assembling the three blades to the spinner disk, check the proper-blade angle — it should be 45 degrees at a distance of 1⅞" from the center.

If possible, dope the model by spraying. I use a vacuum-cleaner spray attachment and very thin color dope. Apply just enough to produce an opaque finish.

The completed model should balance at former No. 5. Add weight to the nose or tail if it doesn't. Test fly on a loop of ⅛" Pirelli, 10' long. Bend the rudder about $^{1}/_{32}$" to the left and place a $^{1}/_{16}$" piece of balsa between the fuselage and nose plug on the upper right side. This is to produce down- and left-thrust to cause a left circle, and to avoid a power stall.

Our Stormovik was test flown over concrete without damage, but locate a softer

[illegible] if you can! Wind perhaps 100-200 turns and launch level, with just enough speed [illegible] keep it level, from perhaps two feet of altitude. If it circles too tightly, remove some rudder [illegible] thrust offset. If it stalls, it may be necessary to cut loose the front or rear of the stabilizer and shim. Our model did not require this. It has left rudder [illegible] mentioned and about 1/32" down- and left-thrust. It flies in circles perhaps 75 feet in diameter. As the trimming is completed, longer and heavier motors [illegible] substituted for longer and higher flights. As you do so work up [illegible] full turns in small increments!

Classical Gas

Continued from [illegible]

contour and attach the flaps using your favorite hinges. I still rely on the old faithful "Jim Walker" fabric hinges, but nylon ribbon and other commercial hinges work well. At this point, you should fabricate the flap pushrod and install it permanently in the flap horn and bellcrank. Also secure the bellcrank nut with a drop of solder. Don't forget to lubricate the bellcrank with Vaseline before adding the center-section planking. Cap the ribs with 1/16 x ¼" strips and add tip outlines, leadout guide tubes, tip fillers, and leading edge tip blocks. Hollow the inboard block, leave the outboard solid and add ¾-oz. weight to the outboard tip block.

The stabilizer and elevator construction shown on the plans produces a light, strong structure and is quite easy to make. Cut 1/16" sheet to outline, add leading edges, spars, filler blocks, and ribs as shown and allow to dry. Make up a large sanding block approximately 4 x 8" and sand the elevators to a tapered section. Add top sheeting and sand to shape when dry. Install control horn and hinges again using some type of horn bushing.

At this point the wing and stabilizer assemblies should be carefully sanded and given two coats of clear dope. Cover with medium Silkspan and add five more brush coats of clear dope or until a gloss appears. Hang these assemblies up to cure while the basic fuselage is under construction.

Select two 1/8 x 3" sheets having straight edges for the fuselage sides. The top edge of these sheets will provide reference for the alignment of thrust and flying surfaces, so be selective. Cut the fuselage sides to shape taking note of the relief for the bottom sheeting from the firewall aft. Cut fuselage doublers from 1/16" plywood and join to sheet balsa with contact cement. Glue motor mounts to plywood doublers with white glue keeping them parallel to top edge of sheet. Fabricate firewalls from 1/8" plywood. The width of the fuselage will be governed by the width of your engine and fuel tank. Veco stunt tanks are 2" wide, so this is a minimum figure to work from. Be sure this inside width will allow room for your engine between the mounts and allow the required 2-degree engine off set.

Join fuselage sides to firewall bulkheads and apply pressure with rubber bands. Place cardboard under bands to prevent crushing of balsa. Pull fuselage sides together at rear and join with a 1/8" sq. spacer. Check alignment carefully. Add remaining fuselage formers. When dry, cut away fuselage sides so that the wing and flap assembly may be inserted from the bottom. You will replace this wood later, so be careful how you make these cuts. With the fuselage secured to your bench with suitable weight, align and cement the wing securely in place. Be very critical of alignment. Cut and shim as necessary, taking frequent measurements from leading and trailing edge centerlines to fuselage top and from wing tips to bench

and tail post. Replace cut-away portion and reinforce fuselage-wing joint with fiberglass cloth adhered with full-strength dope.

Fabricate the elevator pushrod from 3/32" music wire and make a plywood pushrod guide for the center bulkhead. Install the pushrod in the elevator horn and with a washer and solder. Thread the pushrod guide in place. This will be glued the center bulkhead later after the control system is completed.

Install the stabilizer aligning it in the same manner as the wing. Hook the pushrod to the flap horn, lubricate the control system and secure the plywood pushrod guide with the controls in the neutral position. Control movement should be approximately 45 degrees up and down for flaps and elevators.

Revent a 4-oz. Veco stunt tank as shown and mount securely. Install blind nuts for engine mounting. Make up and install tail wheel assembly. Sheet bottom of fuselage with 1/8" balsa cross grain. Tack glue top block and shape with razor plane. Remove and hollow, then reglue securely. Install 3/16" sheet rudder offsetting leading edge 2 degrees to left. Build up turtle deck shown on plans. Add filler blocks nose and make removable cowl from soft pine. Attach with four No. 4 x 3/8" sheet-metal screws. Sand nose to pleasing contour with sanding block. Bend main landing gear from 1/8" music wire. Plywood gear doors are attached to tin tabs with wire brads inserted through drilled holes clipped and soldered. Solder tabs to landing gear wire.

This completes the basic structure of the airplane. All exposed balsa should now be carefully sanded with progressively finer paper until you have removed all imperfections. Apply two coats of clear dope, sand smooth, and cover all wood with light Silkspan or Jap tissue applied with a brush dipped in thinner. This is followed by four or five more coats of clear dope sanded lightly between coats.

We have emphasized light weight and alignment in the construction of this model and your next step, the application of the finish, can make or break a stunter. Think light. Spraying is recommended but if you must brush the color on, pick a color that will cover in two and not more than three coats. I once used a 46-oz. Nobler up to 54 coats, trying to brush on a light color to my satisfaction. If you have access to spray equipment, by all means use it. The original Classical Gas was finished by spraying one thin coat of silver and three coats of clear dope tinted blue with plastic dye. Trim is black butyrate dope and can be applied under or over the tinted clear.

In any event, go easy on the pigment dope as the weight build is very rapid. Some modelers apply a clear overcoat and after a two-week curing period, sand this dull, and rub it with rubbing compound. You can rub out any finish for better appearance but be sure to wait until the dope has had a chance to cure.

Any desired cockpit detail should now be added and covered with a Sig canopy.

Install a dependable .60 stunt engine and mount a 10-6 two-blade or 9-6 three-blade prop and spinner. Check for balance. Add ballast as necessary to bring CG to position shown on plan.

You have undoubtedly read many construction articles where the airplane flew "right off the board" without trim changes. This is because they were built light, in proper alignment and as specified on the plan. If you have done likewise you won't be disappointed in the Classical Gas.

Before that first test-flight, check to see that the engine runs the same speed inverted as right side up. If the engine slows in the inverted position, shim up under the engine mounts with metal plates. If it speeds up, you may have to file the aircraft engine

mounts down to reposition the needle valve in respect to the centerline at the fuel tank.

Learn how long your engine runs on a full tank and plan your flights to avoid maneuvers when you're near empty. You will find stunt flying much more rewarding if you "program your mind" for each maneuver and know what you're going to do before each flight. Feel your Classical Gas out for a flight or two, then cut loose and have a ball.

Unicon

Continued from page 43

base and cut a small hole to insert the small bent end of the engine holder. Glue the holder in place. Reinforce the holder with an engine holder cover as shown in Fig. 3.

One final touch and the Unicon will be ready for painting. Cut three 10" lengths of shroud line (plastic coated thread). Tie each to the screw-eye. Tie the other ends to the upper ends of the stays. Put the rocket completely together, tucking shroud lines and shock cord into the body.

Finish the rocket in any color scheme desired, remembering to use colors that will be highly visible against the sky. The original Unicon was spray painted with white Aero Gloss and brush painted with red. The decals are available from NAR.

Fig. 4 indicates a typical recovery configuration. The nose cone, body and three fins flutter down as one piece. The rocket has been designed to be flown with ¼A3 engines. If more powerful, heavier engines are used, one or two nose-cone weights must be added.

The Unicon has the option of being spin stabilized. Simply twist the nose cone slightly while holding the body stationary. This results in an equal displacement of fin canting, thus giving better stability.

Kestrel

Continued from page 35

ered models. (There is no reason why you should not use more powerful twin L. V. actuators with larger Nicads for 15-powered models.) To be able to fly small models safely and reliably is a distinct advantage for modelers with small field facilities.

Because the transmitter was specifically designed for use with magnetic actuators, and features a 95/5% width variation, the rudder action is smooth and proportional to stick movement over the total range.

My only complaint was the method of coupling the actuator to the rudder. The double yoke system seems to be unnecessarily complicated and the method shown on the drawings works excellently, is simple to install and uncouple. Also shown on the drawing is a mounting board arrangement for the receiver, actuator, switch and charging socket.

This model is a proven design and is strong enough to stand up to the average flying conditions. Please think twice before "improving" it by strengthening various parts, sheeting in the underside of the wing, or adding .049 to the power pylon, etc.

Construction: Try to get clear, straight-grained wood that is tough but not too heavy (not the carroty type that snaps easily across the grain). Bear in mind that the lighter the completed model, the better it will fly and the softer it will come to earth. White P.V.A. glue (Titebond or similar) can be used for nearly all the construction. Cut out all the balsa wood and plywood parts before commencing construction; this saves time in the long run and makes assembly enjoyable.

Fuselage: Glue to the 1/16" sheet fuselage sides 1/16" nose doublers, ⅛" center-section

doublers, 1/16 x 3/16" uprights and stern posts. Glue in position, when the sides are dry, formers F.2, 3 & 4, temporarily holding together the stern posts to assure correct alignment. The tail unit can either be removable or glued in position and, if the former is contemplated, dowels will have to be allowed for in the fuselage.

Epoxy a piece of plastic tubing between grooves in the stern posts and glue these posts permanently together. Rear fuselage top and bottom sheeting should all be fixed with the grain running crosswise. The 1/4" top nose sheeting to the nose can have the grain running lengthwise and the forward underside sheeting is reinforced with 1/32" or 1 mm. plywood. Add the 3/16" plywood nose keel (which serves as a weight box) and the hard block balsa to either side. Sand the whole assembly smooth and drill for dowel holes.

Wing and engine pylon: The wing sheeting is made up of front and rear balsa sections with a strip of 3/32" x 1/4" spruce between. This spruce strip can be omitted if very tough (stringy not brittle) balsa sheet is used for the wings. Cut the wing panels slightly oversize on plan to allow for the camber. As the wings are left open on the underside it is suggested that the sheet balsa be well sanded before construction, and also given two coats of sanding sealer. All wing ribs should be cut initially as identical sizes.

Pin down the 1/2 x 3/16" shaped L.E. and glue and pin the ribs in position. When the joints between the L.E. and ribs have dried, the 3/32" sheet is glued in position — the pins can be left in the ends of the ribs to hold them in position. Both wing panels are constructed in a similar manner. When the panels are dry remove them from the building board and trim the underside of the ribs toward the trailing edge. This method of wing construction automatically builds in a desirable amount of wash out.

Add the 3/8" wing tips and sand the wing panels to a smooth finish. Cut slots for the dihedral brace and glue in position at the same time joining the two wing panels together. Reinforce the trailing edge of the wing center with 1 mm. plywood, bent in the middle to follow the dihedral angle, but not cut. The engine pylon is made up from a 3/16" balsa center core, with lightening hole, and 1 mm. plywood sides. These ply sides extend through a slot in the 3/32" sheet wing root ribs. Make sure the joint between the wing slot and the pylon is well glued to prevent ingress of fuel. Former F.1. is epoxied to the pylon and reinforced with 1/2" balsa side cheeks. Round off the side cheeks to blend with former F.1.

Tail Surfaces: These are all from sheet balsa and straight forward to construct. I prefer to use sewn nylon thread hinged for the rudder, but whatever method is used, it must be absolutely free in operation. This applies also to all linkages and bearings, etc. With the limited amount of torque available from small magnetic actuators, any binding or stiffness of any description can be tolerated.

Radio installation: The advantages of having the receiver actuator and attendant equipment and all wires neatly mounted on a board are numerous. It is electrically and mechanically superior to having all items separately installed and the board can be changed easily from one model to another. The 3 7/8" x 1 1/2" mounting board will fit most small models. The Nicads are kept separate and their position can be adjusted to obtain the correct center of gravity.

I used 600 ma. Nicads to reduce the amount of ballast to be added to the nose. Most technical radio experts will agree that the vertical whip aerial is the most effective. It is a practical proposition. A suitable length of thin (about 1/48" dia.) piano wire is epoxied and bound to F.4 at the rear of the

wing and the shortened receiver aerial lead soldered to it.

Completion of model: Methods of finishing the Kestrel will depend to a great extent on the modeler's preference but try not to overdo the decoration which adds weight. Under no circumstances should the bottom of the wing be covered and I would suggest that the wings be uncovered, and decoration added only to the leading edge and center section. Fuel-proof the whole of the model paying particular attention to the pylon area and top of the wings. Use a small strip of foam plastic between the fuselage and bottom of the wing leading edge to prevent any fuel from seeping into this gap.

Flying: Before ever venturing onto the flying field for test flights check carefully: 1) that the balance of the model is correct; 2) the wings and tail surfaces are free from warps; 3) the radio equipment is functioning 100% (99% is just not good enough).

Wait for a relatively calm day for test flights. The Kestrel flies quite slowly and some glides will give a good indication of the glide trim. Do not launch it too hard or with the nose up. Adjustments to elevator trim can be made by adjusting the incidence of the wing or, if a removable tail assembly is used, on the tailplane. Alternatively, a hinged trim tab can be fitted to the tailplane.

Power flight can be undertaken with the engine running rich on the propeller reversed to reduce the thrust. Make a note of any tendency to turn, climb, or dive both under power and on the glide. Aim to trim out for a straight, flat glide first; any further adjustments for powered flight should then be made with engine thrust-line alterations.

You will find this model really easy to fly with no vicious tendencies. It holds its nose into the wind very nicely, needing little rudder correction. On the first dozen or so flights the model has only landed on half of those occasions; the other flights were terminated straight into the hands of the waiting helper.

If you live in an area where strong thermals are prevalent it may be necessary to fit some form of D.T.

Siamese Twin

Continued from page 39

all the wings can be attached to the fuselage and your attention turned to the new center section. Also, the stabilizer and wing trailing edges should be sanded to a sharp edge for proper scale appearance.

For the wing center section, a block of wood, ⅜ x 3 x 4" is needed. White pine was used in this case, but basswood, Philippine mahogany or balsa could also be used. The easiest way to lay out your pattern is to place the fuselage assemblies on a level surface. The nacelles and ventral gondola form a natural three-point suspension and eliminate a lot of tedious bracing or leveling. Butt the wood block against the end of the chopped wing and, with a sharp pencil, draw in the upper airfoil contour. Repeat for the opposite end, and while you have the block in position, draw in the leading and trailing edge chord lines. Then by using the cutoff wingtips, the lower contour can be drawn in.

From this point on, you'll have to rely on a sharp knife and the familiar Mk I eyeball computer to work the wood down to shape. Needless to say, you'll want to leave the section a little full until it has been attached to the model. Obviously, it's easier to take a little off than to put it on, unless you have some fiberglass handy.

Once you have the basic shape, you will want to come in ⅜" from the end and cut or saw a line approximately 1/32" deep around the wing. After you repeat this at the other end, you will be able to take a sharp knife and form a tongue that will fit exactly inside the wing stub. This not only

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American Aircraft Modeler will begin in an early issue a new and unique department to be edited by a staff of specialists in various areas of modeling. Purpose is to provide a forum, a home-base, for the presentation of technical, design, and how-to-do-it items of all types, shapes and sizes, in a more capsuled treatment than the traditional, full-length article.

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adds strength to the finished model, it also makes for easier assembly.

Now that you have the center section ready to install, liberally smear the tongues with tube-type plastic cement. Rub it in with your fingers and let dry thoroughly. Then the parts can be joined in a normal fashion. Because of the three-point suspension effect of each fuselage, all you have to do is attach the center section to the wing stubs and let the entire assembly dry for at least 24 hours. Note that while the inboard wings retain their normal dihedral, the connecting center section is perfectly level.

Be sure to check, before the cement sets, that the fuselages measure exactly 7" apart, centerline to centerline. Also check that both wingtips are the same distance above the work surface.

While waiting for everything to dry, use the time to chop one nacelle from the wing of that third kit. Once the nacelle is in hand, the excess plastic should be trimmed to follow the contour of the nacelle.

As are the fifth nacelle, main gear doors, and all exhaust stacks have been installed, the model is ready to prime.

Although the exhaust stacks for the HE-111Z are different from the standard Heinkel bomber, those provided in the kit can be made to work. Using a scale calibrated in tenths, measure back from the forward ends of one inch and cut off. Then divide this into four equal spaces and file a vee-shaped notch into the stack at each location. Now, all that remains is to slightly flatten the outsides of the stacks and cement into position.

The "bathtub" dorsal canopy was taken from the Revell 1/72 CH-54A Skycrane kit. If you don't want to spend that kind of

money for two kits (two canopies needed), put your imagination to work. There's more than one way to do any given job!

Gear struts and wheels can be assembled and painted whenever it's convenient. However, they'll be one of the last things to be installed.

Once the primer is dry, you can [illegible] where putty is needed. Between putty, primer, sandpaper and patience, you should be able to eliminate every seam on the model.

Since the HE-111Z was built from the HE-111H-6 (later examples used the HE-111H-16), and the Airfix kit is the HE-111H-20, you'll have to add windows to the ventral gondola and along the lower fuselage sides. The easiest way to do this is to cut a rectangle covering the entire window strip. Then cut a piece of clear plastic to size and install. Later, when the model is painted, you [illegible] easily mask the actual window area, leaving the framing exposed for painting.

When you're satisfied that all seams [illegible] properly filled, spray the undersurface with Pactra's Aero Blue. Then, the uppersurface [illegible] sprayed Dunklegrun (dark green) and after it is thoroughly dry, the splinter pattern is masked. Swartzgrun (black green) is sprayed last to complete the camouflage. Now, the props, transparencies and gear can be installed.

Incidentally, if you would like to make your props removable, the plastic shaft can be replaced with either a finishing nail of the proper diameter or a piece of brass tubing.

Codes (DG + OV) [illegible] white and are located on both sides of both fuselages. The same codes, in black, go under the wings (D + G under the right wing, O + V under the left). The black-white-black iron cross [illegible] used [illegible] all eight positions.

Push-Air

Continued from page 53

[illegible] various speeds; it's a simple job [illegible] turn the head to adjust to the rpm desired. Price is $24.95 with tank. The loader costs $5.95 but also can be used with the Brown jet engine, available later.

One big advantage over a glow engine, of course, is lack of noise; great for those who have to fly [illegible] a city park. Another advantage is its cleanliness of operation. It allows one to make a simple model and not accumulate weight with [illegible] lot of fuel-proof dope which can warp light structures, causing all sorts of flying trouble. Furthermore, piston-powered indoor flying is again possible.

Push-Air [illegible] simple to build. Use light balsa throughout. Build the fuselage by cementing the bulkheads [illegible] one fuselage side while it [illegible] lying flat [illegible] the workbench, and then cement the other side [illegible] top and weight it down until dry. Then sheet cover the top [illegible] bottom of fuselage. The dowel wing struts [illegible] simply poked through the fuselage top, and cemented.

After the wing is built and covered with tissue, paint with dope that has been cut 50% with thinner. Make the holes in the ¼" sheet to accept the other end of the wing struts, and cement well. The engine is just cemented to the plywood engine firewall, which is cemented [illegible] the center of the trailing edge. Slip the CO_2 containers [illegible] place and cover that portion of the fuselage. A simple wire axle with wheels is cemented directly to the bottom of the fuselage. Use several coats of cement.

Flying is easy. Using thrust adjustments for turn, do remember that [illegible] a pusher, the down-thrust adjustments [illegible] opposite [illegible] those of [illegible] tractor. Since the engine can [illegible] in either direction, merely turn the prop around with the flat of the blade to the rear.

The engine can best be enjoyed in [illegible] nice scale job. This simple model will serve as [illegible] guide [illegible] size and weight for such a project.

Spinks Akromaster

Continued from page 32

tion," Hillard added.

After a busy summer of 1969 flying air shows, the Akromaster was once more entered in the Nationals which were again held on its home ground. It was flown by Hillard and by Bobby Bishop. The hoped-for championship failed to materialize, due to the near-flawless performance of Bob Herendeen in a Pitts Special, and a pair of small mistakes by Hillard which dropped him to fourth, barely 1% out of second place. Bishop placed seventh in his first real try.

That, to date, is the competitive history of the still new Spinks Akromaster. It hasn't set the aerobatic world on fire yet, but it has certainly made its presence felt. A second competition machine is planned for the near future, and will incorporate many changes based on experience with the first, and is expected to weigh 200-250 lbs. less.

A development of the Akromaster will soon take to the air, and this one could become important to the art of aerobatics. Known only as the Model 10 (no agreement yet on a catchy name), it will be a two-place, side-by-side trainer which Spinks Enterprises hopes to have certified by FAA for unlimited aerobatics. With the Zlin Trener ineligible for use by aerobatics schools due to the lack of reciprocal licensing agreements between the U. S. and Czechoslovakia, there is currently no fully aerobatic training plane available for the many schools springing up all over the country. If the Model 10 achieves its goals, these schools could have a fine trainer which could double as an air show and competition aircraft.

Assuming Charlie Hillard and/or Bobby Bishop qualify for the U. S. Team — and the failure of both is almost unthinkable — the sleek Spinks will be shipped to RAF Hullavington in July for the sixth World Championships. Competition will be murder, but Charlie Hillard thinks the team "will have as good a chance as ever. Our guys are better — understand the system — will have had practice. For the first time, we'll have a real chance."

Fuselage: White with the following longitudinal stripes: blue-white-red-white-blue. Black diagonal stripe. Red spinner. Yellow propeller tips.

Wings: Red with single white sunburst. Near tip, two black stripes with white edging.

Vertical tail: White with the following horizontal stripes starting from the top: red-white-black-white-blue-white-black-white-red into dorsal fin.

Horizontal tail: Upper surface: white with single red sunburst; single black fore-to-aft stripe. Lower surface: red with single white sunburst; single black fore-to-aft stripe with white edging. White tip (as seen from side view of aircraft).

Landing gear: White legs. Pants white with the following horizontal stripes: blue-white-red-white-blue.

N7727: White on blue stripe on vertical tail.

Spinks Akromaster: Black script on red horizontal fuselage stripe.

Canopy: Light blue tinted.

Cardboard Cutie

Continued from page 14

intact at the hinge. Divided elevators be joined by a round toothpick laid in the corrugation opened up by the hinge slit, and glued in place.

The curved chin-piece and windshield can be curved in the same way as the wing, but there is no necessity of glueing the lap joints as on the single-surface wing.

All fuselage top and bottom pieces are cut to fit down into the fuselage between the sides, so they must be cut to the *inside* widths of the fuselage. I cut only half way through the cardboard to this measurement and leave a border around it where I cut all the way through. This way, I can strip off the cut-through surface and the corrugations down to the other, wider surface, thus leaving a flange which can be glued to the raw edges of the sides, sealing them; and then after the glue has set, these flanges can be trimmed with the fuselage sides.

The firewall block should be glued into position and trimmed before the windshield and chin-pieces are glued in. Pegs or wood can be inserted as shown for rub-

ber-band mounting the landing gear. For adaptation to free flight, pegs can be inserted in the cabin top for rubber-band mounting the wing.

Landing gear is made of 1/8" music wire bent to the pattern shown on the plans. This is then soldered to a piece of tin. Before soldering, rub the tin and wire in the area of the solder joint. Then using a large soldering iron and acid-core solder, make the joint. If you are unfamiliar with soldering techniques, get help from dad or big brother. Soldering is an important element in modeling and should be mastered. It is quite easy with the proper tools.

When your solder joint has cooled, scrub the joint with a brillo pad to remove all acid. Then mount the wheels using solder to retain them.

If you have no chance to use solder, an adequately strong joint can be made using epoxy glue. But before applying the epoxy glue, scrape and rough up the tin and wire. Use two applications of epoxy, applying the second coat after the first is hard.

The usual pushrod and bellcrank control system is too familiar to require description or instructions as to mounting. The extremely simple system which I employed on this plane may require some explanation, however. It consists of a control horn and nylon monofilament lines running through eyelets to a yoke to which the control lines are snapped. The yoke reduces the sensitivity and increases the mechanical advantage of the control while automatically limiting its movement. The system is practically invisible, yet is mounted completely externally. It is drag-free and positive, having no slack whatsoever in the linkage and is particularly well-suited to light models.

Before mounting the engine, it will be

necessary to disassemble the tank of the Cox 049 Baby Bee. Normally, the needle valve and cylinder are upright. However, after loosening the four screws which hold the tank together with the engine's crankcase you will be able to rotate the crankcase 90 degrees. Retighten the screws. Now the cylinder is pointing outside the circle on the right side of the plane and the needle valve is again upright.

Cardboard is quite tough in a crash and won't shatter or split. I flew this plane into my battery and tool box one day several years ago and crumpled a wing. I merely unfolded the wing, and although you can see the resulting crease on the under side of the wing, the plane is still flying, with no further repair. Not a patch, scrap of tape or wood, or even a drop of dope or glue was used. If a part should be damaged, or if in building a mistake should be made, a person can simply butcher another cardboard carton for more material.

Concerning flying characteristics, the model is surprisingly realistic. With a Cox 049 it is adequately powered for control-line flying. In flight, the plane is responsive but not overly sensitive. After the engine quits, the plane should be flown to the ground, flared out and stalled onto the deck like a full-size light aircraft. The plane can be flown in fairly stiff breezes, but be ready then to back up in case the lines start to go slack. After all, this little crate doesn't tug on the lines like a 60-powered job.

For a final word, I'd like to list once more the advantages of using this rather unlikely material for model building. First, it's cheap. It's easy to work with and easy to repair. And if you make a mistake in building, it's easy to replace. It lends itself to simple construction, as every corrugation forms a spar so that rigidity is obtained without elaborate structural bracing. It's rugged, almost to the point of indestructibility in a crash. Just don't store the spare tire on top of it in the trunk of your car.

It seems to me that this plane would adapt to a radio-control trainer. It has flown free-flight, and it has sufficient capacity for R/C equipment.

If you look long enough and in the right places, you can find a better quality of cardboard — such as is used in merchandising displays in stores — with a slicker surface having no evidence of the ridges from the corrugations. Some of these cardboards have one surface made of a very high quality clear white paper similar to bristol board. Quite a dressy finish can be applied over this.

If you want a trainer for a young fellow, in either U-control, free flight or radio control, get a patrol out into the alleys to raid your local merchants' rear lot; and then it's time to start building. Remember, there's plenty more material where this stuff came from.

On the Scene

Continued from page 10

citing chapter and verse from the rule book?)

O.K., now just how do you get 350 flights through two flight-lines in two days? Next year's Nats R/C Director take note! With the cooperation of the U. S. Navy and a little luck you can run four qualification flight-lines at the '70 Nats and the pattern boys will get plenty of attempts. Not too many new tricks are involved in doing this but sacrifice is made; as is often done, the pattern is significantly shortened. The other tricks to speed things up include cutting the time allowed, starting engines while the prior contestant taxis clear of the runway, and no lunch break. The judges barely had time to change score sheets between flights. Flyers don't hesitate when they are told "your time is started!" The only holds between flights were intentional while the judges occasionally checked the rules book.

Larry's contest had two noteworthy characteristics becoming more common in the West these days. The first of these was to have enough small prizes that each contestant wins something. Throughout the meet there were contestants randomly selected by lottery to receive merchandise. At the end of flying, many got awards for everything from "worst crash" to "dirtiest transmitter." Finally, the winners were well rewarded.

The final treat at most pattern contests on the Coast these days is a fly-off of the top three or top five scorers. Usually a special award is given for this winner. Larry again pulled a switch and provided a ready-to-go Lanier Citron to be flown by each of the top five. Each pilot had to fly this Mark I Mod O airplane and winning rested on the pilot's skill alone. Naturally each pilot fouled up the trim adjustments prior to passing the transmitter to the next man in line. Very interesting!

Well, the Californians did it again. So let's take notes and go on for even further improvements and a better hobby.

Computer Airfoils

Continued from page 33

operate at a C_L of 1.0 to obtain slow-speed flight, while a record speed model may operate at a C_L of less than 0.1. By keeping the wing drag low in the normal C_L range of a stunt model (0.2 to 0.4) the craft will be slippery and lose much speed during the [illegible]. Having low drag at lift coefficients below 0.2 is not important because this means the model is already in a steep dive and could use little drag to prevent the build-up of excessive speed. One [illegible] our top stunt men use the beefy 20% thick sections is to give slow, constant-speed performance.

3) High lift, even in inverted flight. This need respects the emphasis on the inverted maneuvers and especially on the outside loops. If you have ever seen a high-speed unintentional snap-roll at the bottom of an outside loop, you've seen a wing that didn't have enough lift.

4) Minimum center-of-pressure travel. A small amount of CP travel permits a smaller stabilizer and, hence, less total aircraft drag. Further, it requires less torsional stiffness in the wing and allows a lighter structure.

5) Ample thickness. This simply [illegible] it's easier to make a light, stiff wing if adequate airfoil thickness exists.

6) Non-critical stalling characteristics.

Point 1 in turn called for some kind of compromise. A readily stalling wing is highly desirable for the initiation of a spin. But the same stalling characteristics can make a pilot quite unhappy when his model suddenly drops one wing or the other during the final landing approach phase.

Four sections were "designed" on the computer. Their thicknesses ranged from 10% to 14% and the high points were in the unusually forward region of 20% of the chord.

As to the first two sections, E-426 and E-428, points 1, 2 and 6 were considered as having priority and in this respect these sections should be tops. Not being symmetrical sections a slightly lower C_L max has to be accepted for inverted flight in this case. For that reason they can only be used to advantage in aerobatic models sporting wing chords of 12" or greater. The wing loading of these models should be kept low, too (say up to 16 oz. per sq. ft. at the most). The peculiar shape of the tail end of these sections must be carefully duplicated, otherwise the calculated performance cannot be realized.

Since many modelers dislike wide wing sections and the desirable low wing loading can only be achieved by using larger models, Prof. Dr. Eppler designed two more sections which carry the designations E-474 and E-475, respectively.

To quote the Professor: "I prefer the E-474. With the requirements mentioned above the computer won't 'cooperate' in the case of sections thicker than the E-475. So please stick to lower wing loadings for aerobatic R/C models and keep the aspect ratio reasonably high, unless you are prepared to accept high losses at high positive and negative lift coefficients due to low values of the aspect ratio. With this type of wing layout, adequate aileron efficiency should be available."

For the modeler interested in the theoretical polar of one of these sections, a comparative graph has been prepared which shows the polar of the symmetrical E-474, as established by actual tests in the Göttingen wind tunnel, and the computed, theoretical polar of the Eppler section. This is shown in Fig. 1 where excellent agreement is found between the theory and experiment at a Reynolds number of 400,000. The model club of Kaltenkirchen has used the E-474 in several R/C models. They displayed unusually forgiving flight characteristics, permitted very slow flying — on the verge of the stall — took off after a short ground run and yet, with a bit of coaxing, spun readily. In addition they were found to be well suited for hydro models.

The drawings of the Eppler sections are shown in Fig. 2. The first two, E-426 and E-428, are semi-symmetrical sections 10 to 11% thick and showed slightly better lift in the upright position with about 1% of thickness in the mean camber line. When compared to an NACA 2412 section, which has a 2% camber line with the maximum at 40% aft of the leading edge and a thickness of 12%, the E-426 might be the rough equivalent of an NACA 1211. This translates as a 1% camber line with a 20% maximum and 11% thickness. However, the main point is that the Eppler sections are considerably different from the standard sections.

The second two are E-474 and E-475 which are symmetrical sections with 14 to 15% thickness. Stabilizer areas as small as 10 to 15% of the wing area should be possible with these wings.

If you want to pioneer a bit, try one of these sections and let us know how it works out. Maybe you can get the performance you want from your stunt job even with that power-draining muffler on the engine!

(Acknowledgment is gratefully given to the German model magazine *Flug and Modell-Technik* and the British *AeroModeller* where this article appeared earlier.

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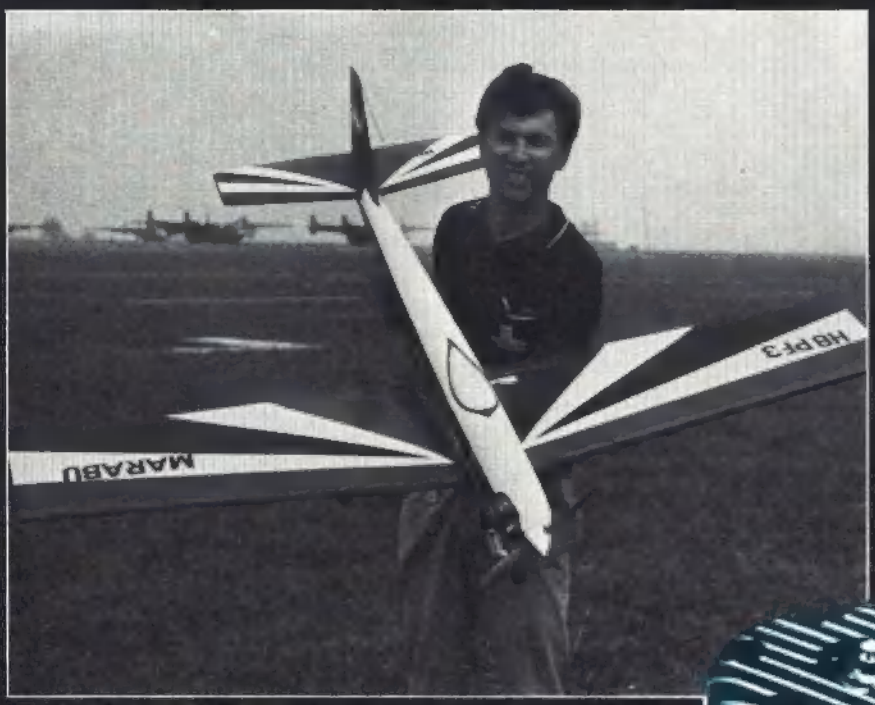

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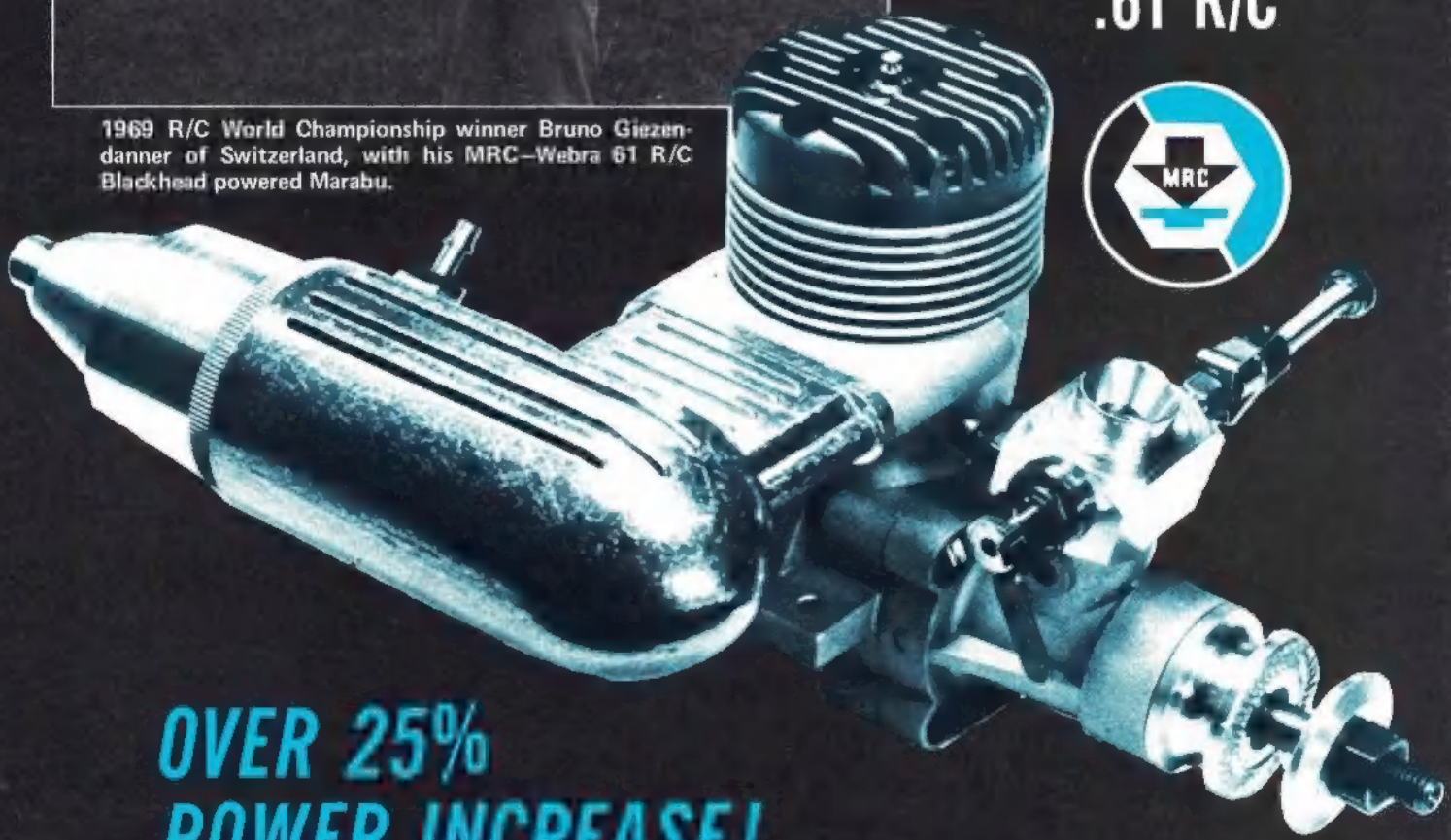

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